# Marine Fisheries Abstracts


UNITED STATES DEPARTMENT OF COMMERCE

Frederick B. Dent, *Secretary*

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Robert M. White, *Administrator*

NATIONAL MARINE FISHERIES SERVICE

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## FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Marine Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

*Marine Fisheries Abstracts* contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

0.12 (2.3) DYNAMIC SHRIMP GRADER AND GRADING METHOD

Skrmetta, Raphael Q. (4610 Press Dr., New Orleans, La.) (pat.)
U.S. Patent 3,784,007
Official Gazette of the U.S. Patent Office 918, No. 2, 678 (Jan. 8, 1974)

This dynamic shrimp grader and grading method may be applied to all types of shrimp. The system utilizes a series of sequential, slightly inclined trays, each of which has a number of parallel V-shaped channels with grading slots at their ends. FTP



0.35 EFFECT OF SODIUM NITRITE CONCENTRATION ON THE FORMATION OF NITROSOPYRROLIDINE AND DIMETHYLNITROSAMINE IN FRIED BACON

Sen, Nrisinha P., Jagannath R. Iyengar, Barbara A. Donaldson, and Thavil Panalaks (Food Research Laboratories, Health Protection Branch, Dept. of Health and Welfare, Ottawa, Ontario K1A OL2, Canada)
Journal of Agricultural and Food Chemistry 22, No. 3, 540-541 (May-June 1974)

Bacon samples were prepared to contain 0, 50, 100, 150, or 200 p/m of sodium nitrite, by adjusting the level used in the pickle. The test sample was fried, and the entire fried sample (including the rendered fat) was analyzed for dimethylnitrosamine (DMN) and nitrosopyrrolidine (NPy).

The bacon prepared without any added sodium nitrite showed no DMN or NPy (the detection limit is 2 ppb), but all the samples, which had been prepared with added nitrite contained 2 to 20 ppb of the nitrosamines. The levels of the NPy varied directly with the initial level of nitrite used in preparation of the bacon. However, there was no correlation between the final levels of sodium nitrite in the bacon just before frying and that of the NPy in the fried products. It is possible that NPy in the fried bacon may originate from an intermediate nitroso compound that is produced during the early stages of the curing of bacon, and thus its concentration depends upon the initial nitrite concentration.

Fried bacon, prepared from samples purchased in the retail market, contained from "non-detected" to 3 ppb of DMN and from 15 to 75 ppb of NPy.
[2 tables, 15 references] FTP



0.12 (2.3) AIR POLLUTION CONTROL SYSTEM FOR FOOD PROCESSING APPARATUS

West, Clarence W. (208 S. La Salle St., Chicago, Ill.) (pat.)
U.S. Patent 3,805,686
Official Gazette of the U.S. Patent Office 921, No. 4, 1414 (Apr. 23, 1974)

This air pollution control system is used for treating contaminated air generated by food processing apparatus. FTP



0.4 (1.70) VIBRATION DETECTION BY THE MACULA NEGLECTA OF SHARKS

Fay, Richard R., James I. Kendall, Arthur N. Popper, and Albert L. Tester (Dept. of Zoology, University of Hawaii, Honolulu, HI 96822)
Comparative Biochemistry and Physiology 47, No. 4A, 1235-1240 (Apr. 1, 1974)

Other reports indicate that sharks are able to detect sound. Anatomical evidence in later reports indicates that the structure macula neglecta (two longitudinally arranged strips of sensory hair cells) in sharks is located in the a acoustic pathway to the inner ear. In this present report, the physiology of the macula neglecta was studied in four blacktip reef sharks by recording microphonic potentials in response to point-source vibratory stimulation of the head. This type of stimulation is similar to experimental designs used in studies of bone conduction. The results of the study showed that the parietal fossa (a depression in the chondrocranium) is more sensitive to stimulation than adjacent portions of the shark head and provides in part the most direct pathway for vibration to the inner ear. In the study the authors found evidence to suggest that the macula neglecta is a velocity detector in its response to vibrations of 100 to 600 Hz. The authors suggest that the organ may be involved in underwater sound detection in the shark.
[3 figures, 12 references] SW



0.12 (2.3) PATTY MACHINE

Wilson, Jackie Neal; assignor to Hobart Manufacturing Co., Troy, Ohio (pat.)
U.S. Patent 3,800,362
Official Gazette of the U.S. Patent Office 921, No. 1, 23 (Apr. 2, 1974)

This machine will form meat product patties on a high-volume basis. FTP

0.12 (2.3) PRAWN SHELLING

Harman, R. J. (pat.)
British Patent 1,343,533
Food Technology 28, No. 6, 99 (June 1974)

Shrimp are automatically shelled by moving lengthwise past a pair of cutters. FTP

0.19 TUNA BUTCHERING METHOD AND SYSTEM
(2.3)(3.331)

Lapeyre, James M.; assignor to the Laitram Corp., New Orleans, La. (pat.)
U.S. Patent 3,800,363
Official Gazette of the U.S. Patent Office 921, No. 1, 23 (Apr. 2, 1974)

This is an electronically controlled automated butchering method and system for separating the loin portions of transverse tuna slices from the subdivision of a frozen whole tuna. FTP

0.4 TREATMENT OF JELLYFISH STINGS

Loder, J. S.
J. Am. Med. Assoc. 226, No. 10, 1228 (1973)
Aquatic Sciences & Fisheries Abstracts 4, No. 4, 5, Abstract No. 4Q2960 (Apr. 1974)

Any meat tenderizer containing papain may be used to treat jellyfish stings. The tenderizer should be liberally sprinkled on the wetted, injured area until the stinging is relieved. The papain breaks down the simple polypeptides released by the nematocysts of the jellyfish into nontoxic amino acids. SW

0.112 UNDERWATER TELEVISION--A TOOL FOR THE MARINE BIOLOGIST

Myrberg, Arthur A., Jr. (Rosenstiel School of Marine and Atmospheric Science, University of Miami)
Bulletin of Marine Science 23, No. 4,824-836 (Dec. 1973) [In English; Spanish summary]

Animal behavior is a small but rapidly developing field of biological research. There are various factors limiting the study of the behavior of marine animals, but two factors appear to be prominent: (1) many good observers are unwilling or unable to dive, and (2) lack of capability to observe behavioral phenomena over an extended time at great depth. Most of the ocean is beyond the capability of divers; where divers can operate, the short duration of a dive, difficulties with writing, the physical encumbrances, and the disturbances caused by the presence of the diver result in data that are inadequate for analyses.

There are tools being developed that might increase the efficiency of observers in data acquisition, provide for longer periods of observation, and reduce the physical exertion required in dives. These tools are: the submersible, the underwater habitat, and underwater television. This report describes the television systems used in underwater observations. One of the systems that is discussed is the Oceanographic Research Tower of the Naval Undersea Research and Development center in San Diego. The system is mounted on a vertical-rail track that extends from the surface to the bottom (20 m). The camera and its various adjustments are remotely controlled. Diagrams illustrate the placing of the apparatus on the bottom; and a list of companies that have information relating to underwater television is also presented.
[3 figures, 1 table, 55 references] SW

0.5 A METHOD OF MEASURING BACTERIAL GROWTH IN AQUATIC
(9.16) ENVIRONMENTS USING DIALYSIS CULTURE

Baskett, Russell C., and William J. Lulves (Dept. of Microbiology, University of Missouri School of Medicine, Columbia, MO 65201)
Journal of the Fisheries Research Board of Canada 31, No. 3, 372-374 (Mar. 1974)

A simple dialysis apparatus is described that is suitable for culturing bacteria, and that can be left in a lake or pond for long periods of time and that allows for daily sampling without the removal and disruption of the dialysis bags. It consists of a styrofoam flotation ring connected by threaded brass rods to a bottom ring of heavy rubber garden hose. Dialysis bags (26 cm long and 48 mm thickness) are plugged at one end with solid No. 11 neoprene stoppers and at the other end with one-hole neoprene stoppers fitted with glass tubes and suspended between the rings. To study microbial growth and behavior in situ, the dialysis tubing suspended from the styrofoam flotation ring is filled with sterile distilled water, placed in a farm pond, and inoculated with a suspension of the organisms being studied. At predetermined time intervals, the contents of the dialysis bags are mixed with a 10-ml pipette, and aliquots are removed for plating on appropriate bacteriological media.
[1 figure, 5 references] FTP

0.321 STRUCTURAL PROTEIN OF REPTILIAN SCALES
(1.93)
Baden, Howard, Sylvester Sviokla, and Irwin Roth (Dep. Dermatol., Massachusetts Gen. Hosp., Boston, Mass.)
Chemical Abstracts 80, No. 21, 118437e (May 27, 1974)

0.5 IODIDE OXIDATION BY A MARINE BACTERIUM
Gozlan, R. S., and P. Margalith, (Dep. Food Eng. Biotechnol., Technion-Israel Inst. Technol., Haifa, Israel)
Chemical Abstracts 80, No. 21, 118003h (May 27, 1974)

0.6 (6.54) UTILIZATION OF EDIBLE PROTEIN FROM MEAT INDUSTRY BY-PRODUCTS AND WASTE. I. FACTORS INFLUENCING THE EXTRACTABILITY OF PROTEIN FROM BOVINE AND OVINE STOMACH AND LUNGS

Young, R. H., and R. A. Lawrie (Food Science Laboratories, Dept. of Applied Biochemistry and Nutrition, University of Nottingham, Sutton Bonington, Loughborough, Lecis. LE12 5RD, England)
Journal of Food Technology 9, No. 1, 69-78 (Mar. 1974)

The general purpose of this project is to determine whether the proteins of meat waste can be fabricated into palatable forms for human consumption. The first step involves the examination of the extractability of the proteins from meat waste in a form that retains their solubility and nutritive value. In the present study, the authors determined the solubility characteristics from the bovine and ovine stomach and lung tissues at various pH values, salt concentrations, and temperatures. The extractability of the protein was determined by homogenizing 2-g portions of the minced tissue in 60 ml of aqueous extracting medium. The total volume of the extractant was the total of the water present in the tissues, the amount of HCl or NaOH added to produce the desired pH, and the water added to make a final volume of 60 ml. The temperatures used varied from 0° to 50° C, and the extraction times from 0 to 3 h. pH values ranged from about 2.5 to 11.5; salt levels tested were from 0.01 M to 1 M.

The native proteins can be recovered in quantity from bovine and ovine stomach and lung tissues at room temperature over a wide range of pH values using



0.7 (9.16) SUBSTITUTION OF BREWER'S SINGLE CELL PROTEIN INTO PELLETED FISH FEED

Windell, John T., Ronald Armstrong, and James R. Clinebell (Laboratory of Animal Physiology and Behavior, University of Colorado, Boulder, Colo.)
Feedstuffs 46, No. 20, 22-23 (May 20, 1974)

Brewer's single cell protein (BSCP) consists mostly of the cells of microorganisms grown on the waste from the brewing industry. The finely-ground dried BSCP is reddish-gray and has a pleasant brewery aroma. In this study a 140-day feeding trial was conducted with rainbow trout to determine if BSCP could serve as a supplemental source of protein in pelleted fish feed by replacing certain ingredients in each of three test diets. The three test diets were prepared with 10% (diet 1), 15% (diet 2), and 50% (diet 3) of BSCP mixed with 8% pure corn oil. In diet 1, BSCP replaced 10% brewer's yeast; in diet 2, BSCP replaced 10% condensed fish solubles and 5% wheat germ; and in diet 3, BSCP replaced 15% herring meal, 10% brewer's yeast, 10% condensed fish solubles, 8% wheat middlings, 5% wheat germ, and 2% blood flour. The control diet was the standard Colorado 1/8-inch pellet feed. The proximate composition of the BSCP was crude protein, 44.4%; crude fat, 8.0%; ash, 12.6%; and moisture, 5.0%. Amino-acid analysis of the BSCP indicated that nine of the ten essential amino acids for trout and salmon are present and seven of these are present at levels that exceed minimum requirements.

There appeared to be no difference in palatability between the control diet and test diet 1 (10% BSCP) and diet 2 (15% BSCP). The fish in these groups



0.7 (9.16) USE OF DRIED SLUDGE FROM PAPER PROCESSING WASTES IN TROUT DIETS

Orme, Leo E., and Carol A. Lemm (Bur. Sport Fisheries and Wildlife, Spearfish Fisheries Center, Spearfish, S. Dak.)
American Fishes and U.S. Trout News 19, No. 2, 17-19 (Mar.-Apr. 1974)

A 285-day feeding trial was carried out with rainbow trout to determine the acceptability in the diet of dried sludge from paper processing wastes. The dried sludge was used at 25% and 50% levels in the test diets. The amounts of ingredients in the control diet and in the two test diets were adjusted to achieve protein levels of 40% and fat levels of 9%. The ash and fiber contents of the three diets were different, and no attempt was made to balance them out. The dried ground sludge was odorless, light tan in color, and consisted of: crude protein, 42.3%; crude fat, 0.43%; ash, 27.69%; fiber, 10.6%; moisture, 3.03%; and NFA (nonfat extractables), 16.0% (by difference). Bacteriological analysis indicated that the dried sludge was free of pathogenic bacteria. The three diets, control, test diet 1, and test diet 2, contained 32%, 20%, and 15% herring meal and 0%, 25%, and 50% dried sludge, respectively.

Apparently the sludge was palatable to the trout because they fed aggressively on all three diets. Feed conversions for the fish on the control diet, test diet 1, and test diet 2 were 1.45, 1.58, and 1.72, and growth rates (wt. gain per day) were 18.2%, 13.7%, and 12.1%, respectively. The mortality rate was low and about the same in all three groups.



0.9 WHAT I HAVE LEARNED ABOUT EXPLORATORY RESEARCH

Gresham, William F. (E. I. du Pont de Nemours and Co.)
Research Management 17, No. 2, 8-10 (Mar. 1974)

The author expresses his views on how to encourage creativity and to direct exploratory research towards commercial products. Generally, highly creative people are somewhat more reserved and slightly more of the introvert type than the noncreative people. The chief difference between the two groups is that highly creative people have a tremendous desire to be creative while the noncreative people do not have the desire. The leader has many obligations relative to effective exploratory research. The leader should:

1. Maintain a balanced adequately diversified program to serve the department's or company's needs supported by ideas which should lead to successful research efforts.
2. Require justly high standards in all endeavors.
3. Strive for top proficiency in areas and borderline areas of interest to one's company.
4. Maintain excellent surveillance of all literature directly or indirectly related to the company's interests.
5. Help select new employees of the highest caliber.
6. Help train employees to be outstanding performers.
7. Strive for high creativity coupled with high proficiency and sound judgment.

0.7 (9.16)

The authors conclude that the dried sludge from the treatment of paper processing wastes has potential as a protein ingredient for trout feeds. Nevertheless, more extensive tests using several diet formulations should be carried out before it can be considered for use on a production basis.

Data are given on the amino-acid composition and mineral content of the dried sludge.

[5 tables]

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0.6 (6.54)

aqueous solvent of low salt levels (e.g. 0-0.01 M NaCl). The electrophoretical patterns of the proteins from the lung and stomach tissues showed marked differences; the subunit molecular weights for the lung protein ranged from 13,500 to 87,000 and that for the stomach protein from 13,500 to 145,000.

[5 figures, 2 tables, 11 references]

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0.9

8. Always maintain a winning attitude even though confronted with apparently unsurmountable obstacles.
9. Relish the role of a partner in solutions of difficult research problems.
10. Enjoy the job while helping others to enjoy their jobs.

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0.5 (9.6)

THE MICROBIOLOGICAL SAFETY OF FOOD

Hobbs, Betty C. (Food Hygiene Lab., Central Public Health Lab., London, England), and J. H. B. Christian (Commonwealth Scientific and Industrial Research Organization, Div. of Food Research, New South Wales, Australia)

Published by Academic Press, 111 Fifth Ave., New York, NY 10003 (Dec. 1973), xiv + 496 pp. Price £7.50.

This book contains the proceedings of the Eighth Symposium on Food Microbiology and Hygiene. The Symposium was organized by the International Association of Microbiological Society and it was held at the University of Reading (England) in Sept. 1972. The topics covered by the papers deal with the bacteriology of various commodities in relation to food poisoning, epidemiology of food-borne infections in man and animals, special laboratory techniques, legal and nonlegal specifications, and education. Author and subject indexes are included.

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0.4 DANGER IN THE SEA

Fraser-Brunner, A. (Carnegie Aquarium, Edinburgh, United Kingdom)

Published by Hamlyn, London, England (1973), 128 pp. £1.75.

Aquatic Sciences & Fisheries Abstracts 4, No. 3, 248, Abstract No. 4Q2917M (Mar. 1974)

The book provides information on aquatic plants and animals that can cause injury to those who contact them. The text is arranged taxonomically with illustrations which include photomicrographs of sponge spicules (needlelike bones) and Physalia (Portuguese man-o'-war) nematocysts. The organisms discussed include those responsible for red tide, stinging hydroids, corals, jellyfish, and poisonous anemones. The hazards of food poisoning from molluscs and entrapment in a Tridacna (giant clam) are also described. An unusual animal is the octopus of the Great Barrier Reef, Octopus maculosus, whose saliva can kill in about 5 min. Echinoderms (sea urchins, sea cucumbers) are described in detail relative to poisonous spines and pedicellariae (pincers on a stalk). Dangerous fishes, sharks, and whales are covered. Barracuda, stingrays, moray eel, sand swordfish are also described. The electric fish and sea lamprey are described. Most of the hazardous animals dealt with are fishes.

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0.7 (9.16)

showed good growth and low mortality. The fish fed test diet 3 (50% BSCP) showed a slight decrease in appetite after several weeks of feeding.

The average feed conversion rate for the control was 1.678; test diet 1, 1.660; test diet 2, 1.755; and test diet 3, 2.398. Fish fed test diet 3 (50% BSCP) also showed lower length of growth (inches per day) than did fish fed the control and test diets 1 and 2.

The external appearance (color, fins, body conformation, scales, eyes, and gills) and the internal appearance (liver, heart, kidney, spleen, and depot fat) of the control and test diets 1 and 2 fish were all good. Test diet 3 fish showed some loss of dorsal fin but otherwise their appearance resembled that of the control and test diets 1 and 2 fish.

The rainbow trout are able to digest 53.3% of the BSCP and 76.1% of the protein of BSCP.

The authors conclude that BSCP can be used as a dietary component for rainbow trout.

[10 tables, 7 references]

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1.85 (1.017)(2.03) STORAGE OF PRAWNS IN REFRIGERATED SEA WATER

Ruello, J. H. (CSIRO Div. of Food Research, North Ryde, New South Wales, Australia)
Australian Fisheries 33, No. 2, 6-9 (Feb. 1974)

Mechanically refrigerated seawater (RSW) has replaced ice as the cooling and storage medium on most of the large prawning vessels. The use of RSW cools the prawns more rapidly than ice, and the task of icing prawns at sea is eliminated. In addition, prawns stored in RSW have a better appearance and flavor than those stored in ice; the spoilage rate is also reduced. In contrast, prawns have limited storage life in RSW since deterioration may occur due to enzyme action, uptake of chemicals in the RSW, bacterial action, and physical damage.

Black spot on the prawns is a condition caused by enzyme activity; it is characterized by a blackening of the head, abdomen, and the tail fan. The unattractive appearance makes them unacceptable to consumers. Since black spot is due in part to the availability of oxygen, the use of carbon dioxide or nitrogen to displace the dissolved oxygen in the RSW was investigated. Nitrogen bubbled through the RSW delayed the development of black spot for only 1 day. Prawns held in RSW containing $CO_2$ did not develop black spot for 7 days. This delay in developing black spot was attributed to the acid condition produced by $CO_2$. The prawns did not have black spot but they were unacceptably tough after cooking. The acid condition also partially dissolved the prawn shell. Of the many chemicals tested to prevent black spot, sodium metabisulfite was the cheapest and most effective. The procedure suggested for the prawn fishery is to use this compound



2.03 (2.06) EFFECT OF MINCING ON GLYCOLYTIC ACTIVITY IN PRERIGOR ATLANTIC COD (GADUS MORHUA) MUSCLE STORED IN ICE OR FROZEN

Nowlan, Sandra S., and W. J. Dyer (Dept. of Environment, Fisheries and Marine Service, Halifax, Nova Scotia, Canada)
Journal of the Fisheries Research Board of Canada 31, No. 4, 473-476 (Apr. 1974)

Earlier work has shown that certain metabolites, such as glycogen and high energy phosphate, are not evenly distributed throughout the fillet of codfish; for example, adjacent transverse slices can differ in glycogen content by as much as 40%. The present authors are engaged in studies on the glycolysis and nucleotide changes in prerigor Atlantic cod. With such variations in magnitude of distribution of metabolites in the cod tissue difficulties were encountered in obtaining samples with similar levels of metabolites. Other workers have tried mincing of tissues to effect a more homogeneous distribution of substrates and cofactors, but in the case of ox muscle, mincing had a stimulatory effect on glycolysis. In the present study, the authors examined the effect of mincing on the rates of glycolysis and loss of high-energy phosphate in prerigor cod muscle slices and in the minced muscle during storage unfrozen at 0° C and also during freezing and storage at -3° and -6° C. The purpose was to determine the feasibility of using minced samples to replace muscle slices in projected glycolytic studies. The work has practical relevance because the results might provide better understanding of possible quality changes that may occur in comminuted fish products and in defining proper handling procedures for comminuted fish products.



1.953 BEHAVIOR OF SOUTHERN RIGHT WHALES: R/V HERO CRUISE 72-3

Cummings, William C., Paul O. Thompson, and James F. Fish (U.S. Naval Undersea Center, San Diego, Calif.)
Antarctic Journal of the United States 9, No. 2, 33-38 (Mar.-Apr. 1974)

Observations of southern right whale behavior were made in waters of the Gulf of San José and the Gulf of Nuevo on either side of the Valdés Peninsula of Argentina. Two humpback whales and 25 to 30 southern right whales were sighted near Punta Rasa about 250 km north of the Valdés Peninsula, when the Hero was sailing toward Bahia Blanca for repairs. The discovery of the northern group was considered to represent a substantial increase in the estimated population of right whales of Argentina. The clear and protected waters around the Valdes area attract breeding right whales. The underwater sounds of the whales were recorded. The sounds included blowing (or respiration), bellowings, moans, and belchlike noises. The role of sound in the behavior of whales was studied by playing back sounds of the right whales and killer whales. No obvious reactions by the right whales was observed. Life-size models of killer whale dorsal fins were floated downwind of the courting right whales. The authors were surprised when two whales stopped their courting behavior and swam toward the models. The two whales resumed courtship in the midst of the models which were accompanied by killer whale sounds. Mating behavior and jumping (breeching) were also observed by the authors from the Hero.
[4 figures, 9 references] SW



2.1127 (2.1125) SOME CONSIDERATIONS OF THE PROBLEMS ASSOCIATED WITH THE USE OF LIVE BAIT FOR CATCHING TUNAS IN THE TROPICAL PACIFIC OCEAN

Hester, Frank J. (Honolulu Laboratory, Southwest Fisheries Center, National Marine Fisheries Service, NOAA, Honolulu, HI 96812)
Marine Fisheries Review 36, No. 5, 1-12 (May 1974)

The principal species of tuna taken by baitfishing are skipjack tuna, yellowfin tuna, and albacore tuna. This article deals with live-bait fishing for the tropical tunas--yellowfin and skipjack (albacore are taken in temperate waters). The author reviews and discusses tropical tuna bait-fishing from the standpoint of types of bait, catching the bait, holding and transporting the bait, fishing the tuna schools with live bait, and the supply of bait.

The preferred baitfishes for tuna fishing are the clupeoids, principally the anchovies and related species. The clupeoids are good baits, being of proper size (25-100 mm), having a silvery appearance, and demonstrating the behavior that induce feeding activities in the tuna. When the clupeoids are scarce, other species that are used include: Mugilidae--mullets; Mullidae--goatfishes; Apogonidae--cardinalfishes; Pomacentridae--damselfishes; Atherinidae--silverside; Lutjanidae--snapper; Poeciliidae--mosquitofish; Siganidae--rabbitfish; etc. The factors which determine the use of particular baitfishes are (1) supply of the species; (2) mortality of the baitfishes during catching, holding, and transporting; and (3) the effectiveness of the fishes in influencing the feeding behavior of tuna.

2.1128 FISH TRAP

Parker, Gordon J. (P.O. Box 131, Marine, Minn.) (pat.)
U.S. Patent 3,800,464
Official Gazette of the U.S. Patent Office 921, No. 1, 49 (Apr. 2, 1974)

This fish trap is constructed of plastic mesh and has a wire frame. FTP

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2.1127 (2.1125)

Baitfishes are caught by various gear including the bait seine, lampara net, purse seine, and drive net. In the coral-island areas, baitfishes are caught by night (light) baiting using a lift net.

Over 20% of the world's production of tuna is caught by the live-bait fishing method. Dependable supplies of suitable live bait are the key to successful tuna baitfishing. Aquaculture may be a possibility for supplying baitfishes in areas where natural supplies are limited or lacking. The author suggests, also, the possibility of developing artificial baits.
[7 figures, 2 tables, 35 references] FTP

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1.85 (1.017)(2.03)

as a dip. The prawns are immersed for 30 sec in a 5 g/liter solution of sodium metabisulfite. The sulfite level in the prawns after the dip was 15 mg/kg, but it was reduced to 0-10 mg/kg after cooking or washing for 30 min. High concentrations of sodium metabisulfite in RSW are required to prevent black spot in prawns. At levels of 500 mg/liter black spot did not develop in the prawns, but the sulfite level in the flesh after cooking and washing was 26 mg/kg. The best use of sodium metabisulfite to prevent black spot in prawns is as a dip. Before placing the catch in RSW, it should be dipped in a solution of sodium metabisulfite to stop the development of black spot and the RSW should be maintained at -1.5° to 0° C.
[4 figures, 13 references] SW

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2.03 (2.06)

The minced muscle of cod showed a threefold increase in the rates of glycogen breakdown and loss of high-energy phosphate (dephosphorylation of ATP) at 0° C over that occurring in unminced samples. During freezing and holding of the minced muscle at -3° and -6° C, the reactions were accelerated, but the rates in the frozen minced cod muscle were similar to those in the unminced muscle; this indicated that mincing has no apparent stimulatory effect on glycolytic activity and dephosphorylation of ATP if the muscle is frozen immediately after it is minced. Thus, the authors conclude, minced cod muscle can be used instead of intact slices of muscle in glycolytic studies below 0° C with comparable results so long as freezing takes place immediately after mincing.

These results have application in the preparation of deboned comminuted fish products. With prerigor fish muscle, glycolysis will occur while the fish is passing through the deboning machine; the reaction rate will depend upon the time delay and temperature of processing. Subsequently, additional glycolysis will take place during freezing of the product as influenced by the freezing rate. The present findings indicate, however, that the glycolysis rate in the deboned, frozen minced muscle will be no greater than that in the intact muscle.
[4 figures, 10 references] FTP

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2.1128 FISH AND CRAB TRAP

Rea, Harry E. (4667 Camelot Dr., New Orleans, La.)
U.S. Patent 3,800,465
Official Gazette of the U.S. Patent Office 921, No. 1, 49 (Apr. 2, 1974)

This basket-type trap contains a cable and means for anchoring. FTP

2.113 TAR-EPOXY MARINE BOTTOM PAINT COMPOSITIONS

Yoshitake, Tadashi (pat.)
Japan. Kokai 73 97,934 (Dec. 13, 1973)
Chemical Abstracts 80, No. 18, 97519p (May 6, 1974)

1.93 [PRELIMINARY RESULTS OF THE TAGGING OF THE MARINE TURTLE (1.012)(9.17) IN MEXICAN WATERS (1966-1970)] RESULTADOS PRELIMINARES DEL MARCADO DE TORTUGAS MARINAS EN AGUAS MEXICANAS (1966-1970)

Molinar, Emmanuel Vargas
Serie Información INP/SI:112, Instituto Nacional de Pesca, Subsecretaría de Pesca, Secretary de Industria y Commercio, Mexico (1973), 27 pp. [In Spanish]

2.113 CORROSION PREVENTION OF STEEL ARTICLES

Ueda, Kenji, and Isamu Motomura (Mitsubishi Heavy Industries, Ltd.) (pat.)
Japan. 73 36,809 (Nov. 7, 1973)
Chemical Abstracts 80, No. 20, 115479g (May 20, 1974)



2.116 (9.11) TRACKING COD GADUS MORHUA IN A SCOTTISH SEA LOCH

Hawkins, A. D., D. N. MacLennan, G. G. Urquhart, and C. Robb (Marine Laboratory, Torry, Aberdeen, Scotland)
Journal of Fish Biology 6, No. 3, 225-236 (May 1974)

Techniques to locate or track individual fish are important in the collection of information on the energy expenditure of free-living fish, their reactions to natural and artificial stimuli, and the means by which they navigate or seek out favorable areas. In this study, equipment was developed and used to follow the movements of free-swimming individual cod in the sea. By this sytem, a pulsed ultrasonic transmitter is inserted into the stomach of the cod, and the fish is tracked by measuring differences in the time of arrival of the acoustic pulses at a widely spaced array of omnidirectional hydrophones. The hydrophones were connected by cable to a shore laboratory. The movements of cod in an enclosed sea loch (a nearly landlocked bay or arm of the sea) were plotted with the equipment. The results indicate that movement of the fish in two dimensions could be readily plotted. The researchers found that after an initial period of adjustment and extensive movement, the cod became less mobile and adopted a nocturnal pattern of activity.
[8 figures, 1 table, 10 references] FTP



2.15 COLOR AND SOME COMPOSITION CHANGES IN OCEAN PERCH (SEBASTES MARINUS) HELD IN REFRIGERATED SEA WATER WITH AND WITHOUT CARBON DIOXIDE

Longard, A. A., and L. W. Regier (Dept. of the Environment, Fisheries and Marine Service, Halifax Laboratory, Halifax, Nova Scotia, B3J 2R3, Canada)
Journal of the Fisheries Research Board of Canada 31, No. 4, 456-460 (Apr. 1974)

Earlier work showed that when ocean perch were held in refrigerated sea water (RSW) aboard ship the skin of the fish tended to become bleached. The color of ocean perch skin is an important aspect in their quality assessment. The purpose of this study was to assess the value of holding ocean perch in RSW with added carbon dioxide ($CO_2$). The $CO_2$ might help decrease content of the fish with oxygen and thus prevent oxidative bleaching of the skin pigments.

The whole ocean perch were held in a laboratory-scale RSW system. The ratio of fish to sea water was one to one. The recirculating seawater was maintained at -1° C. $CO_2$ was bled into the refrigerated seawater at a rate of about 1 liter per minute. The fish were held in the RSW system up to 12 days. At periodic intervals the skin of the fish was checked for color by a color meter, and also it was analyzed for carotenoid content. The fillets were analyzed for trimethylamine, ash, potassium, and sodium contents.

The color of the skin of the ocean perch held in RSW for 12 days at -1° C was as good as the fish held in ice. When $CO_2$ was added to the RSW, retention of the skin color of the fish was improved. Storage conditions did not seem to



3.15 [EFFECT OF ULTRAVIOLET IRRADIATION ON MEAT MICROFLORA]

Mudretsova-Viss, K. A., and D. V. Zav'yalova (Plekhanov Inst. Of People's Economy, Moscow, U.S.S.R.)
Prikladnaya Biokhimiya i Mikrobiologiya 9, No. 4, 640-644 (1973) [In Russian; English summary]
Food Science and Technology Abstracts 6, No. 1, 177, Abstract No. 1S22 (Jan. 1974)

Ultraviolet (UV) irradiation showed high bactericidal activity against organisms that grew on meat and caused spoilage; 5 min of irradiation destroyed 99% of all bacteria. UV irradiation of cooled meat to prevent spoilage appears to be a promising procedure. SW

2.114 (2.118)

affect the total extractable carotenoid pigments. The ocean perch stored in RSW with $CO_2$ kept in a better condition than did the ocean perch held in ice or RSW. The ash content of ocean perch held in RSW increased, whereas the ash content of the fish held in ice decreased. The potassium losses in the RSW- and ice-stored ocean perch were about the same. The sodium content of the RSW-stored fish, and that of the ice-stored fish decreased. The potassium loss and the sodium loss between the fish and the RSW did not seem excessive but they had not reached equilibrium in the 12 days of storage. FTP
[4 figures, 10 references]

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3.26 READY-TO-USE BATTER PRODUCT

Earle, Roland D. (749 N. Southlake Dr., Hollywood, FL 33020), and Morton S. Baum (pat.)
U.S. Patent 3,784,710
Official Gazette of the U.S. Patent Office 918, No. 2, 831 (Jan. 8, 1974)

This liquid, ready-to-use batter mixture is stable chemically and bacteriologically. In addition to the regular ingredients of flour, water, shortening, and flavorings, the batter contains ethyl alcohol to prohibit bacterial growth in the batter at room temperature. FTP

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2.3 (3.12) METHOD OF SIMULTANEOUSLY DEFATTING, DEHYDRATING, AND ELIMINATING BACTERIA FROM FOODSTUFFS

Levine, Irving E.; assignor to Chevron Research Co., San Francisco, Calif. (pat.)
U.S. Patent 3,795,750
Official Gazette of the U.S. Patent Office 920, No. 1, 187 (Mar. 5, 1974)

Sterilization, defatting, and dehydration of foodstuffs are accomplished by use of the solvent methoxymethane (dimethyl ether). FTP

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3.18 DISINFECTIVE AND DETERGENT PROPERTIES OF SODIUM METASILICATE

Ezerskii, S. V., and V. A. Emel'yanova (U.S.S.R.)
Chemical Abstracts 80, No. 19, 104401z (May 18, 1974)

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2.117 BOAT FOR STERN FISHING WITHOUT A RAMP WITH TWO DECKS

Mermudez, Javier Ray (Avda-Primo de Rineo, 1-13°, La Coruna, Spain) (pat.)
U.S. Patent 3,797,432
Official Gazette of the U.S. Patent Office 920, No. 3, 694 (Mar. 19, 1974)

The boat is designed so that it may be fished from the stern without a ramp; it has two decks. FTP

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2.113 PLASTICIZERS FOR COATING COMPOSITIONS OF CHLORINATED RUBBER

Torii, Michiaki (Nippon Petrochemicals Co., Ltd. (pat.)
Japan. Kokai 74 97,931 (Dec. 13, 1973)
Chemical Abstracts 80, No. 18, 97414a (May 6, 1974)

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2.3 METHOD OF PACKING SHRIMP

Domeckl, Edward H. (2140 NE. 30th St., Lighthouse Pt., FL 33064) (pat.)
U.S. Patent 3,780,196
Official Gazette of the U.S. Patent Office 917, No. 3, 1133 (Dec. 18, 1973)

The shrimp tails are cut along the dorsal side extending through the first five segments; the meat is left attached to the sixth segment. The meat is lifted above the cut shell and the vein removed. The meat is positioned on top of the shell (but still attached to the sixth segment), and the prepared shrimp are packed in an aluminum tray and frozen. FTP

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2.113 PHYSICOMECHANICAL PROPERTIES OF URETHANE POLYESTER COATINGS UNDER THE EFFECT OF EXTERNAL FACTORS

Kuchma, S. T., R. T. Zhuravleva, L. L. Savchin, V. M. Serga, and Ya. A. Seredenitskii (Ukr. Nauchno-Issled. Inst. Polign. Prom., Lvov, U.S.S.R.)
Chemical Abstracts 80, No. 20, 109890t (May 20, 1974)

3.237 FROZEN FISH PRODUCT

Richardsen, H. (pat.)
British Patent 1,339,241
Food Technology 28, No. 5, 95 (May 1974)

Fish fillets and a noncohesive foodstuff, such as a rice or vegetable composition, are packed in layers. The product is deep frozen to form a compact body that can be cut into portions for cooking. FTP



4.5 CHEMICAL AND ORGANOLEPTIC PROPERTIES OF OXIDIZED FATS

Fioriti. J. A., M. J. Kanuk, and R. J. Sims (General Foods Corporation, Technical Center. White Plains, NY 10625)
Journal of the American Oil Chemists' Society 51, No. 5, 219-223 (May 1974)

Some objective test methods were applied to several fats and oils during their autoxidation and attempts were made to correlate the objective test data obtained with flavor panel scores. The fats and oils used were beef tallow, lard, hydrogenated soybean oil, high oleic safflower oil, and corn oil. The additives used were propyl gallate, butylated hydroxyanisole, citric acid, Tenox 6, and isopropyl citrate. Storage temperature of the samples was 37.8°, 60°, or 75° C. Analyses were made initially and at weekly intervals for peroxide value, benzidine value, thiobarbituric acid value, rate of oxygen absorption, pentane value, and octanoic acid value. Flavor evaluation was made by a panel of 15 people trained specifically in oil evaluation procedures.

The results showed good to excellent correlations with pentane values, oxygen absorption values, peroxide values, and the average flavor scores. Results with the benzidine and thiobarbituric acid spectrophotometric methods did not prove satisfactory. The octanoic acid method was too insensitive to be of value. There was one exception, however, in the case of lard where all the objective test methods gave good correlations with flavor panel data.
[6 figures, 3 tables, 19 references] FTP



4.11 (4.5) FLUORESCENT PRODUCTS OF LIPID PEROXIDATION. II. METHODS FOR ANALYSIS AND CHARACTERIZATION

Malshet, V. G., A. L. Tappel, and V. M. Burns (Depts. of Food Science and Technology and Physiological Sciences, University of California, Davis, CA 95616)
Lipids 9, No. 5, 328-332 (May 1974)

The major objective of this study was to develop analytical methods to detect and monitor lipid peroxidation products formed in vivo and in vitro. The present article is a report on the effect of pH and of chelation upon fluorescence characteristics of in vivo and in vitro lipid peroxidation products and the possible use of fluorescence polarization and fluorescence decay time for the detection of these products. During the peroxidation of polyunsaturated fatty acids, numerous carbonyl compounds, such as malonaldehyde, are formed. These carbonyl compounds react with amino groups of proteins, amino acids, and phosphatidyl ethanolamine to form fluorescent compounds. Measurement of these compounds by fluorescence spectroscopy might result in sensitive and selective methods to determine the occurrence of in vivo and in vitro lipid peroxidation.

The metal chelator europium (Tric[2,2,6,6-tetramethyl-3,5-heptanedionate]) was used in the tests. The effects of this metal chelator and of pH upon the fluorescence of lipid peroxidation products were examined, and the fluorescent decay time and fluorescence polarization values were determined. The fluorescence of the compounds was quenched at basic pH values, and it was restored by adjustment of the pH to neutrality. The metal chelator europium decreased fluorescence intensity by 8%-15%. The authors suggest that the pH effects and metal



4.86 LEATHER LUBRICANTS ASSESSMENT OF FAT-LIQUORING PROPERTIES OF ANIONIC EMULSIFIABLE PRODUCTS OF INDIGENOUS OILS

Kedlaya, K. J., I. Vijayalakshmi, S. C. Sumathi, V. V. Muralidhara Rao (Cent. Leather Res. Inst., Madras, India)
Chemical Abstracts 80, No. 18, 97359m (May 6, 1974)



3.27 METHOD FOR THAWING FROZEN FOOD

Baillentine, Earle W. (3641 Via Palomino, Palos Verdes Estates, CA 90275) (pat.)
U.S. Patent 3,796,804
Official Gazette of the U.S. Patent Office 920, No. 2, 499 (Mar. 12, 1974)

The frozen food is thawed by a homogeneous mixture of steam and air. FTP

4.86 LEATHER LUBRICANTS. II. ASSESSMENT OF FATLIQUORING PROPERTIES OF ANIONIC EMULSIFIABLE PRODUCTS OF FATTY ESTERS AND MODIFIED OILS

Kedlaya, K. J., S. C. Shumathi, K. Vijayalakshmi, and V. V. Muralidhara Rao (Cent. Leather Res. Inst., Madras, India)
Chemical Abstracts 80, No. 10, 49291m (Mar. 11, 1974)

4.11 (4.5)

coordination effects are useful for analysis and characterization of these fluorescent products. Also, fluorescence polarization and fluorescence decay times are useful analytical techniques for the characterization of fluorescent products. [3 figures, 3 tables, 19 references] FTP

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4.11 COUPLED GAS CHROMATOGRAPHY - MASS SPECTROMETRY IN THE SEPARATION AND CHARACTERIZATION OF POLAR LIPIDS

Viswanathan, C. V. (Dept. of Biochemistry, John Curtin School of Medical Research, Australian National University, Canberra City, A.C.T. 2601, Australia)
Journal of Chromatography 98, No. 1, 105-128 (Mar. 27, 1974)

This review covers briefly the methodology involved in the coupled gas chromatography-mass spectrometry separation and characterization of some classes of polar lipids and their molecular species. FTP
[16 figures, 5 tables, 81 references]

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4.9 (4.92) ERNÄHRUNGSPHYSIOLOGIE ERHITZTER FETTE: LANGFRISTIGE TIERVERSUCHE [NUTRITIONAL ACTION OF HEATED FATS: LONG-TERM ANIMAL EXPERIMENTS]

Lang, K. (Physiologisch-Chemischen Instituts der Johannes Gutenberg-Universitäte in Mainz, 7812 Bad Krozingen Schwarzwald-strasse 71, Federal Republic of Germany)
Fette·Seifen·Anstrichmittel 76, No. 4, 145-151 (Apr. 1974) [In German; English summary]

Results of investigations in various laboratories indicated that fats heated for prolonged periods at high temperature become toxic. In feeding studies of these fats, the response to the toxicity may vary from a state of tolerance to growth retardation; a more severe toxicity may cause a large increase in the death rate with anatomical and histological changes in the organs. The fats will not become toxic if the following conditions are maintained: the temperature does not exceed 180° C, local overheating is prevented by effective temperature controls, the fats and oils used are acceptable physically and chemically, and long heating periods are avoided. The absence of toxic properties in fats that have been subjected to these conditions has been confirmed by other workers and by the author in feeding studies in a large number of animals over three generations. These studies indicated that there was a decrease in the carcinogenic polycyclic hydrocarbons in properly treated oil, and a decrease in the occurrence of tumors in the animals. They were also afforded a certain protection against premature death caused by the induction of microsomal enzymes. The author suggests that an overheated or abused fat may develop toxic properties and should be differentiated from fats that are obtained in a good manufacturing practice.
[8 figures, 10 tables, 13 references] SW

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3.4 (0.12) SMOKEHOUSE RACK

Artar, Orhan G., and Charles W. Ross; assignors to Armour & Co., Chicago, Ill. (pat.)
U.S. Patent 3,788,209
Official Gazette of the U.S. Patent Office 918, No. 5, 1778 (Jan. 29, 1974)

This smokehouse rack has restrainers to compress the ends of sausages as they are smoked or cooked to reduce tapered ends and make more uniform slices. FTP

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4.60 6-HYDROXYCHROMAN-2-CARBOXYLIC ACIDS: NOVEL ANTIOXIDANTS

Scott, John W., Winifred M. Cort, Hampton Harley, David R. Parrish, and Gabriel Saucy (Chemical Research Dept., Hoffmann-La Roche Inc., Nutley, NJ 07110)
Journal of the American Oil Chemists' Society 51, No. 5, 200-203 (May 1974)

In this article, the authors describe the synthesis of 6-hydroxychroman-2-carboxylic acids and related compounds, and their antioxidant activity in several test systems. The 6-hydroxychroman-2-carboxylic acids were effective antioxidants in animal fats, vegetable oils, and emulsion systems. The most effective compound was 6-hydroxy-2,5,7,8-tetramethylchroman-2-carboxylic acid; it was effective in both animal fats and vegetables oils. Further tests are being conducted on this compound, and the results will be published.
[2 figures, 1 table, 16 references] FTP

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4.11 CHROMATOGRAPHIC ANALYSIS OF ALKOXY-LIPIDS

Viswanathan, C. V.
Journal of Chromatography 98, No. 1, 129-155 (Mar. 27, 1974)

This review covers the application of various chromatographic techniques, with special emphasis on thin-layer and gas chromatography, in the study of the chemistry and biochemistry of alkoxy-lipids. FTP
[13 tables, 194 references]

6.133 (9.19) REMOVAL OF ORGANOCHLORINE PESTICIDES AND POLYCHLORINATED BIPHENYLS FROM MARINE OILS DURING REFINING AND HYDROGENATION FOR EDIBLE USE

Addison, R. F. (Fisheries Research Board of Canada, Marine Ecology Laboratory, Bedford Institute of Oceanography, Dartmouth, Nova Scotia B2Y 4A2, Canada), and R. G. Ackman
Journal of the American Oil Chemists' Society 51, No. 5, 192-194 (May 1974)

The levels of DDE, DDD, DDT, dieldrin, and PCB (polychlorinated biphenyls) were determined in a series of marine oils of animal origin before and after processing them to margarine stock. The oils consisted of mixed redfish and flatfish oil, flatfish oil, herring oil, redfish oil, seal oil, mackerel oil, and dogfish oil. The raw oils contained from 2-8 p/m of ΣDDT (sum of DDE, DDD, and DDT), 0.00-0.03 p/m of dieldrin, and 3-13 p/m of PCB (as Aroclor 1254). These oils were subjected to pilot plant refining, hydrogenation, and deodorization for margarine stock production.

Residues of all these groups of chemicals were reduced to below detectable limits as a result of the processing. The minimum detectable limit for ΣDDT is 0.06 p/m (0.02 p/m each for DDE, DDD, and DDT); for dieldrin, 0.01 p/m; and for PCB (determined as decachlorobiphenyl), 0.5 p/m.
[1 figure, 1 table, 18 references] FTP



6.190 (0.7) CRYSTALLINE AMINO ACID DIET SUPPLEMENTED WITH GELATIN, SULFATE, METHIONINE AND FISHERY PRODUCTS

Miller, David (Fishery Products Technology Laboratory, National Marine Fisheries Service, NOAA, College Park, MD 20740)
Poultry Science 53, No. 2, 604-609 (Mar. 1974)

Earlier work by the author and his coworkers [Poultry Science 53, No. 1, 224-232 (1974)] did not confirm the observations by E. R[illegible]d R. H. Harms [Poultry Science 49, 1605-1610 (1970)] that sulfate can spar[illegible] equirement for methionine in practical chick starter diets containing cor[illegible] ybean meals or that preformed sulfate may be considered essential. Also, Mi[illegible]al showed that inorganic sulfate failed to stimulate growth of chicks regardless of whether the soybean meal diets tested contained 12, 20.5, or 24% protein and with the sulfur-amino acids content of 0.36 or 0.56% in the low-protein diets and 0.68% or 0.78% in the high-protein diets. They also found evidence of an unknown growth factor (UGF) in fishery products other than inorganic sulfate. C. F. Hinton and R. H. Harms [Poultry Science 51, 701-703 (1972)] suggested that inorganic sulfate was the major component of UGF in condensed fish solubles. Because of these discrepancies, the present author carried out tests to investigate further the nutritional value of inorganic sulfate in comparison with methionine and fishery products in chemically defined basal diets. Four experiments were carried out using chemically defined basal diets containing crystalline amino acids supplemented with a mineral mixture free of sulfate compounds; all diets contained 5% level of gelatin to supply intact protein.



6.32 CARBOHYDRATES OF THE BROWN SEAWEEDS. III. DESMARESTIA ACULEATA

Percival, Elizabeth, and Margaret Young (Chem. Dep., R. Holloway Coll., Englefield Green/Surrey, England)
Chemical Abstracts 80, No. 17, 93179e (Apr. 29, 1974)

6.32 STEROL COMPOSITION OF JAPANESE VEGETABLE FOODS. IV. STEROL COMPOSITION OF FRUITS, FUNGI, MARINE ALGAE, and TEA, COFFEE, AND COCOA

Oka, Yoshiko, Shuhachi Kiriyama, and Akira Yoshida (Shikoku Women's Coll., Tokushima, Japan)
Chemical Abstracts 80, No. 17, 94349x (Apr. 29, 1974)



6.34 POROUS ALGINATE FILMS

Ishimoto, Yoshikazu, Yasu Isome, and Shigeo Katsuyama (Asahi Chemical Industry Co., Ltd.) (pat.)
Japan. Kokai 73 56,758 (Aug. 9, 1973)
Chemical Abstracts 80, No. 10, 48854k (Mar. 11, 1974)

6.34 PARTIAL DYEING OF POLYESTER YARNS USING SPRAY GUNS

Miura, Hideo, Hisao Hisaki, Junnosuke Nagashima, and Akira Hayakawa (Toray Industries, Inc.) (pat.)
Japan. Kokai 73 67,577 (Sept. 14, 1973)
Chemical Abstracts 80, No. 10, 49129q (Mar. 11, 1974)

6.190 (0.7)

Dietary supplementation with inorganic sulfate ($Na_2SO_4$) increased the growth of the chicks, but not significantly, when the methionine content of the crystalline amino-acid diet was extremely low (0.2%); improved growth slightly, but significantly, when the methionine content was 0.35 or 0.40%; improved growth pronouncedly when the methionine content was 0.50%; but did not improve growth when the methionine content was 0.60% or 0.90%. Apparently, the highest levels of methionine in the diet were adequate, and thus the inorganic sulfate was ineffective in producing a growth response. The results indicate that the inorganic sulfate may be a partial substitute for methionine when methionine is present at inadequate dietary levels, but the results indicate no specific nutritional need for preformed sulfate.

Additions of sodium sulfate (0.25, 0.50, and 1.0%) to the basal diet containing an adequate level of methionine (0.90%) gave no improvement in the growth of the chickens, indicating that the methionine level was sufficient to supply the necessary sulfur for all biochemical needs. However, addition of condensed fish solubles or fish meal at the 5% level produced a 7%-8% response in growth, demonstrating that the fishery products contained an unknown growth factor other than methionine or sulfate.

[4 tables, 6 references]

FTP

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6.199 SHRIMP WASTE AS A PIGMENT SOURCE IN BROILER DIETS

Chawan, C. B., and R. W. Gerry (Dept. of Animal and Veterinary Sciences, University of Maine, Orono, ME 04473)
Poultry Science 53, No. 2, 671-676 (Mar. 1974)

The waste from shrimp and crab processing has been used successfully in diets of trout as a source of pigmentation for the fish. The present study was carried out to determine the value of shrimp meal as a source of carotenoid pigment in broiler diets. Two feeding trials were carried out using broiler type, color-sexed chicks; a corn-soybean meal basal diet was used in the first test and a wheat-soybean diet in the second. Shrimp meal was used at 2%, 4%, and 6% levels in the diet.

With the corn-soybean meal diet containing 4% shrimp meal the skin pigmentation of the broilers was unacceptability high. With the wheat-soybean meal diet, levels of 2%, 4%, or 6% of shrimp meal did not produce skin pigmentation in the chicks approaching that obtainable with conventional diets. Thus shrimp meal, with its carotenoid pigments, appears to be valuable as a complementary source of pigment when used in a wheat-soybean meal diet for broilers.

[1 figure, 6 tables, 10 references]

FTP

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6.34 MODIFYING OF SYNTHETIC FIBERS

Orito, Zenichi, Masayuki Shinomura, Seiji Nishida, and Osamu Nakagawa (Mitsubishi Rayon Co., Ltd.) (pat.)
Japan. 73 17,235 (May 28, 1973)
Chemical Abstracts 80, No. 20, 109792n (May 20, 1974)

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6.34 URONIC ACID SEQUENCE IN ALGINATE FROM DIFFERENT SOURCES

Haug, Arne, Bjorn Larsen, and Olav Smidsrod (Norw. Inst. Seaweed Res., Trondheim, Norway)
Chemical Abstracts 80, No. 19, 105111s (May 18, 1974)

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6.34 HYDROLYSIS OF ALGINIC ACID. SYNTHESIS OF D-MANNURONOLACTONE

Revel'skaya, L. G., N. A. Khrenova, A. N. Anikeeva, and S. N. Danilov (Inst. Vysokomol. Soedin, Leningrad, U.S.S.R.)
Chemical Abstracts 80, No. 19, 108775x (May 18, 1974)

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6.34 ALGINATES AS FOOD ADDITIVES

Wylie, A. (Alginate Ind. Ltd., Granestone/Girvan, Scotland)
Chemical Abstracts 80, No. 21, 119242x (May 27, 1974)

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6.0 ANTIBIOTICS FROM MARINE ORGANISMS OF THE GULF OF CALIFORNIA

Andersen, R. J., and D. J. Faulkner (Scripps Inst. Oceanogr., La Jolla, Calif.)
Chemical Abstracts 80, No. 20, 112546r (May 20, 1974)

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6.32 POLYMANNURONIC ACID 5-EPIMERASE FROM THE MARINE ALGA HELVETIA CANALICULATA

Madgwick, John, Arne Haug, and Bjorn Larsen (Inst. Mar. Boikjemi, Norges Tek. Hogsk., Trondheim, Norway)
Chemical Abstracts 80, No. 19, 105269m (May 18, 1974)

6.36 SWEETENED FOODS

Unilever, N.V. (pat.)
Netherlands Appl. 73 02,522 (Sept. 4, 1973)
Chemical Abstracts 80, No. 9, 46649y (Mar. 4, 1974)

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6.37 USE OF ALGINATES FOR THE MANUFACTURE OF CONFECTIONERY (6.34)

Less, Ron (India)
Chemical Abstracts 80, No. 11, 58433m (Mar. 18, 1974)

6.50 FOOD PRODUCT AND METHOD OF MAKING SAME (2.3)

Dunn, Howard J., Marvin Paul Farr, and Otto Schleusner; assignors to Ralston Purina Co., St. Louis, Mo. (pat.)
U.S. Patent 3,795,751
Official Gazette of the U.S. Patent Office 920, No. 1, 187 (Mar. 5, 1974)

Juice produced by cooking of fish and/or presswater from cooked whole fish or cooked fish offal are treated to produce a substantially defatted fish solubles product (fat content about 1% on a dry weight basis). FTP

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6.36 SYNTHETIC TEXTILE TREATMENT WITH MONOSODIUM ALGINATE AND AN EPOXIDE

Ortto, Zentchi Masayuki Shinomura, Seiji Nishida, and Osamu Nakagawa (Mitsubishi Rayon Co. Ltd.) (pat.)
Japan. 72 45,638 (Nov. 17, 1972)
Chemical Abstracts 80, No. 6, 28408q (Feb. 11, 1974)

6.37 POWDERED MALTITOL (6.34)

Ueno, Kunio, Michiyuki Ogawa, Katushi Takahashi, and Toshiaki Tanaka (Kowa Co., Ltd.) (pat.)
Ger. Offen. 2,319,510 (Oct. 31, 1973)
Chemical Abstracts 80, No. 13, 69410c (Apr. 1, 1974)

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6.37 PREPARATION OF SALTED SEAWEED [TANGLE]

Fukushima, Kiyoshi, and Mitsuo Kamata (Ajinomoto Co., Inc.) (pat.)
Japan. 73 16,186 (May 19, 1973)
Chemical Abstracts 80, No. 15, 81112q (Apr. 15, 1974)

6.54 ODORLESS, TASTELESS FAT-FREE PROTEINS FROM FISH

Knutsen, Tryggve L., and Sven O. Osterman (Astra Nutrition AB) (pat.)
Fr. Demande 2,170,160 (Oct. 19, 1973)
Chemical Abstracts 80, No. 15, 81107s (Apr. 15, 1974)

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6.54 EXTRACTING IMPURITIES FROM CRUDE PROTEIN MATERIALS

Blombäck, B. E. G., and M. Blombäck (pat.)
Swed. 357,132 (June 18, 1973)
Chemical Abstracts 80, No. 11, 58622x (Mar. 18, 1974)

6.37 ALGAE IN ANIMAL NUTRITION

De Craene, R. (Serv. Elevage, Minist. Agric., Belgium)
Chemical Abstracts 80, No. 13, 68477e (Apr. 1, 1974)

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6.36 ALGINIC ACID PRODUCTION WITH PROTEASE
(6.34)

Matsunaga, Hideo, Takaichi Oya, and Yasuhiro Naka (Amano Pharmaceutical Co., Ltd.)
(pat.)
Japan. Kokai 73 82,088 (Nov. 2, 1973)
Chemical Abstracts 80, No. 13, 69165b (Apr. 1, 1974)

6.36 RECARBURIZING AGENT [FOR FERROUS METALS]

Makie, Ikuo (Kyoritsu Kogyo Co., Ltd.) (pat.)
Japan. Kokai 73 73,317 (Oct. 3, 1973)
Chemical Abstracts 80, No. 12, 62551r (Mar. 25, 1974)

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6.36 GUNNING REFRACTORY

Kimura, Morihiro, Takeo Ozani, and Hiroyuki Sugimoto (Shinagawa Fire Brick Co., Ltd.) (pat.)
Japan. Kokai 73 59,115 (Aug. 8, 1973)
Chemical Abstracts 80, No. 6, 30152v (Feb. 11, 1974)

6.54 METHOD AND APPARATUS FOR TREATING FISH

Hogstedt, Klas Ragnar M., Vastra Frolunda, Tryggve Lund Knutsen, Asa Station, Erik Torsten L. Svensson, and Sven-Olof Osterman; assignors to Aktiebolaget Astra Nutrition, Molndal, Sweden (pat.)
U.S. Patent 3,804,964 (Apr. 16, 1974)

This invention is a system for the production of a fish protein concentrate having low fat and moisture levels. FTP

6.51 PREPARATION AND USE OF A MODIFIED PROTEIN BINDER FOR THE FABRICATION OF FEED FOR POST-LARVAL AQUACULTURAL ANIMALS

Groninger, Herman S., Jr., and Ruth Miller (Pacific Fishery Products Technology Center, NOAA, National Marine Fisheries Service, Seattle, WA 98112)
Journal of the Fisheries Research Board of Canada 31, No. 4, 477-479 (Apr. 1974)

The preparation of a succinylated fish myofibrillar protein and its use as a binder in aquacultural feeds are described. In the preparation of the modified protein binder, the comminuted fish flesh is suspended three times in 0.5% NaCl solution to remove soluble protein. The insoluble protein is separated by filtration and is then suspended in 0.5% NaCl in a high-speed blender, and additional soluble protein is removed by centrifugation. The sedimented material (mostly myofibrils) is suspended in 3.5% NaCl and then reacted (at pH between 8.0 and 10.0) with solid succinic anhydride or liquid acetic anhydride. In the preparation of feed, the acylated protein (binder) as a viscous dispersion containing about 4% protein, is blended with other feed constituents and the mixture is extruded or prilled to obtain the desired final form. A typical batch of feed is prepared by blending 200 g of acylated protein dispersion with about 32 g (dry weight) of any finely ground feed material. A feed prepared with succinylated myofibrillar protein and Oregon Pellet No. 2 had the following composition (wet basis): moisture, 79.1%; protein, 12.7%; fat, 3.5%; ash, 0.8%; and carbohydrate (by difference), 3.9%. A typical feed for post-larval aquatic animals prepared with the binder had an elastic texture, resisted fragmentation in water, and was readily acceptable to the test aquatic animals.
[1 figure, 1 table, 7 references] FTP

7.8 (8.8) SIMULTANEOUS MEASUREMENTS OF TRIMETHYLAMINE AND DIMETHYLAMINE IN FISH, AND THEIR USE FOR ESTIMATING QUALITY OF FROZEN-STORED GADOID FILLETS

Castell, C. H., Barbara Smith, and W. J. Dyer (Dept. of the Environment, Fisheries and Marine Service, Halifax, Nova Scotia, Canada)
Journal of the Fisheries Research Board of Canada 31, No. 4, 383-389 (Apr. 1974)

A procedure, based on recent modifications of W. J. Dyer's colorimetric (picric acid) test for trimethylamine (TMA) in fish, was developed for determining both TMA and dimethylamine (DMA) contents. By this method, the picric acid test was carried out twice on the same fish extract; once using $K_2CO_3$ as the alkali and once using KOH as the alkali. The proportion of TMA and DMA that reacts with the picric acid to give a color is different with the two alkalis. From these two sets of data on each fish extract, it was possible to calculate both the TMA and DMA contents of the fish. A comparison was made of DMA values obtained by the picric acid procedure and by the copper-dithiocarbamate test on 84 samples of frozen, stored fillets of haddock, cod, cusk, pollock, and hake. A correlation coefficient of 0.94 was obtained between DMA values by the copper-dithiocarbamate test and the picric acid test. The simultaneous measurement of TMA and DMA is especially useful for estimating the quality of frozen, stored gadoid fish fillets. The TMA value indicates the extent of microbiological spoilage that took place before the fish muscle was frozen, and the DMA value indicates the extent of deterioration that took place through action of tissue enzymes during frozen storage.
[5 figures, 11 references] FTP



8.42 CONSEQUENCES OF HIGH NITRATE LEVELS IN FEED AND WATER SUPPLIES

Emerick, Royce J. (South Dakota State University, Brookings, SD 57006)
Federation Proceedings 33, No. 5, 1183-1187 (May 1974)

Nitrate and nitrite in high concentrations may occur naturally in vegetables for humans or forages for animals. In grains used for feed, occurrence of nitrate is minimal. Nitrate and nitrite salts are added to certain processed meat products as preservatives and for color. Water is another important carrier of nitrate, acquiring it from geological formations, fields and feedlots, sewage disposal systems, and industrial activities.

Ruminants and nonruminants are tolerant of nitrate, but ruminants on a poor-quality diet will be adversely affected by a single dose of 75-90 mg nitrate per kilogram body weight. Nitrite is more toxic than nitrate and generally results from the microbial reduction of nitrate either in the rumen (of ruminants), moist feeds prior to feeding, or in water contaminated with organic matter supporting extensive microbial growth. The toxicity of nitrite is through oxidation of the iron in hemoglobin to form methemoglobin which is unable to transport oxygen. Death occurs after 70%-80% of the hemoglobin is converted to methemoglobin. Nitrate administered to nonruminant animals has no effect on the retention of vitamin A. In contrast, nitrite fed to poultry or swine at high levels caused reduction of carotene and vitamin A. However, the levels of nitrite in the normal diets of swine or poultry would not be sufficient to cause a loss of carotene or vitamin A.



7.8 TECHNICAL NOTE: THERMAL PERCEPTION IN THE MOUTH AND LIPS

O'Connor, J. (BLA Hotel and Catering Advisory Services, 29-30 Kingly St., London W 1, England), V. Stevenson, and A. W. Holmes
Journal of Food Technology 9, No. 1, 115-119 (Mar. 1974)

The ability of a group of people to preceive temperature differences is reported in this article. This study may be of interest to those in the institutional feeding and catering services. Catered foods ordinarily are served 'hot'; but this quality is rather subjective and relative. The method used in this study to test thermal discriminatory ability was based on the triangle difference test. Each person was given two separate trios of insulated cups of water under code. In each group of three cups of water, the water in one cup was either 5° above or 5° C below the temperature of the water in the other two cups. Fourteen steps of temperature, at 5° C intervals, were used ranging from 5° to 75° C. Examinations were made by mouth.

There were variations in the perception of temperature difference over the temperature range. In the step 5°-10° C discriminatory ability was low, but in the step 10°-20° C the discriminatory ability was high. Perception of temperature difference was less acute between 15° and 25° C, but was more acute between 25° and 35° C. Above 60° C the sensations of hotness and pain apparently nullify the sensitivity towards temperature difference perception.
[2 figures, 2 tables, 5 references] FTP



8.59 (0.322) FREE AMINO ACID COMPOSITION OF THE SKELETAL MUSCLE OF MIGRATORY FISH

Suyama, Michizo, and Yukio Yoshizawa (Tokyo Univ. Fish., Tokyo, Japan)
Chemical Abstracts 80, No. 15, 82017r (Apr. 15, 1974)

8.59 (8.8) TRIMETHYLAMINE AND VOLATILE REDUCING SUBSTANCES IN FRIGATE MACKEREL (AUXIS THAZARD)

Magno-Orejana, Florlan, Rogelio O. Juliano, and Erlinda T. Bamasihan (Univ. Philippines, Quezon City, Philippines)
Chemical Abstracts 80, No. 21, 119285p (May 27, 1974)

7.9 [WATER ACTIVITY TOLERANCE OF SOME VIBRIO SPECIES IMPORTANT IN FOOD HYGIENE] WASSERAKTIVITÄTS-TOLERANZ VON LEBENSMITTELHYGIENISCH WICHTIGEN KEIMARTEN DER GATTUNG VIBRIO

Rödel, W., H. Herzog, and L. Leistner (Bundesanstalt für Fleischforschung, 8650 Kulmbach, Federal Republic of Germany)
Fleischwirtschaft 532, No. 9, 1301-1303 (1973) [In German, English summary]
Food Science and Technology Abstracts 6, No. 2, 11, Abstract No. 2B27 (Feb. 1974)

The water activity ($a_w$) tolerance of various strains of halophilic Vibrio species was investigated as a possible diagnostic tool. The organisms were cultured in 1% peptone water with zero to 12% NaCl ($a_w$ 0.9988-0.9268) at the optimum incubation temperature. The organism with the highest tolerance was V. costicolus, which produced more than 10% turbidity in NaCl concentrations of 1.5%-12%; it was also the only species that grew at 12% NaCl. Tolerance of V. alginolyticus was 0.5%-11% with optimum at 5%-6%; that of V. parahaemolyticus, 0.5%-9% with optimum at 3%. These two species can be distinguished from one another on an NaCl level of 7% when their turbidity ranges are 43%-81% and 6%-41%, respectively. Tolerance of V. anguillarum was 0.5%-4% with optimum at 1%. These results could be useful for identification of the Vibrio species using 0, 3, 6, 7, and 12% NaCl in 1% peptone water and for determination of the $a_w$ range favorable for their growth in foods. SW

7.8 TASTE ADAPTATION: THE CASE OF THE WANDERING ZERO

O'Mahony, M. (Dept. of Psychology, Bristol University, 8-10 Berkeley Square, Clifton, Bristol 8, England)
Journal of Food Technology 9, No. 1, 1-12 (Mar. 1974)

The author reviews some recent developments in taste psychophysics. In taste adaptation, if the taste receptors signal to the brain the presence of a constant stimulus, the message becomes attentuated; this can be considered as a shift in the zero for taste. The taster perceives this attenuation as a gradual reduction in taste intensity; often the result is that the taste actually vanishes (complete adaptation). The attenuation or adaptation is probably due to a specific inhibition of the taste receptor sites rather than the exhaustion of some receptive substance in the cell. In this review, the author considered one stimulus, sodium chloride.

Apparently, the zero (level of adaptation) for taste varies with salivary content, which in turn varies with physiological changes and any residual taste stimulus that has recently been placed in the mouth. The author discusses the effect of the interstimulus (mouth rinsing or expectoration) on the amount of residual stimulus; this factor appears important in determining thresholds and intensity measures. The effect of language and criterion on the detection thresholds (where the particular taste can be perceived as present although the specific taste is not perceived) is discussed.

In food assessment, researchers should be aware of residuals building up in the mouth and interpret their results accordingly. Furthermore, certain variables such as the interstimulus procedure, should be given proper attention.
[3 tables, 75 references] FTP

9.1 (9.17)(9.6) THE SEA IS ALL ABOUT US

Robbins, Sarah Fraser, and Clarice M. Yentsch (Peabody Museum of Salem, Salem, Mass., and the University of Massachusetts Marine Station, Gloucester, Mass.)
Published by the Peabody Museum of Salem and the Cape Ann Society for Marine Science, Inc., Gloucester, Mass. (1973), vii + 162 pp. Price $5.95, paperback

This book is for the student or interested amateur in ecology in general and particularly of Cape Ann, which shelters Gloucester (Mass.) Harbor. The factors which affect marine organisms are discussed in the first chapter. These factors include salinity, dissolved gasses, light, plant nutrients, animal nutrients, temperature, currents, tides, and substrates. The chapter on the marine environment covers rocky shores, sandy and muddy beaches, and salt marshes, and contains a description of the Cape Ann coastal region. The chapter on the organisms of the marine environment fills most of the book and is divided into plants and animals. The plants include algae and flowering plants. The animal invertebrates covered include sponges, polyps, comb jellies, flat worms, ribbon worms, segmented worms, the arthropods (including crabs, shrimps, and lobsters), mollusks (snails and bivalves), starfish, sea urchins and cucumbers, moss animals, and Bryozoa. The vertebrates include sea squirts, tunicates, and marine fishes of the adjacent waters. Illustrations accompany each subject discussed, and a glossary defines the terms used. A recommended reading list and an index of organisms by common and scientific names are included. SW

8.42

No nitrite-related problems in adult humans caused by consumption of foods containing nitrate have been observed. The very young sometimes show susceptibility to methemoglobinemia induced by nitrite. This condition was reported to be most severe in infants fed formulas prepared from dried milk containing the spores of Bacillus subtilis which reduce nitrates to nitrites intensively. Water containing high levels of nitrate has been implicated as the cause of infant methemoglobinemia; canned spinach containing high levels of nitrate have also been implicated. The bacterial conversion to nitrite occurred after the can had been opened for a long period of time. The reaction of nitrite with certain amines to form nitrosamines, which have been associated with tumor production, has been extensively reported elsewhere. In another report by H. I. Shuval and M. Gruener [Am. J. Public Health 62, 1045-1052 (1972)] the data showed that irreversible brain electrical changes occurred in rats exposed to sodium nitrate in the range of 100 to 2,000 p/m (equivalent to 20 to 400 p/m $NO_2$-N) in their drinking water. This information being new, the author suggests that this area be investigated further.

Based on the data that are available as well as the lack of data in certain areas, continuation of the cautious approach regarding nitrite and nitrate levels in foods and feeds exhibited by governmental and advisory groups is justified.
[77 references] SW

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8.51 (1.93) GENERAL COMPONENTS AND AMINO ACIDS OF EGG YOLKS OF VARIOUS DOMESTIC BIRDS AND SEA TURTLES

Koga, Katsuya, Takao Fukunaga, and Minoru Murao (Lab. Anim. Biochem., Kagoshima Univ., Kagoshima, Japan)
Chemical Abstracts 80, No. 17, 93301p (Apr. 29, 1974)

9.1 (1.89) BIOLOGY AND GEOLOGY OF CORAL REEFS VOLUME II: BIOLOGY

Jones, O. A., and R. Endean (editors) (University of Queensland, St. Lucia, Brisbane, Queensland, Australia)
Academic Press, New York (1973), xxi + 480 pp. $42.50.

This book is part of a four-volume work, two volumes covering the geology and two volumes on the biology of coral reefs. This volume is a multidisciplinary approach to the study of coral reefs and involves different fields of biology. The distribution and contribution of coral reef microorganisms are discussed in chapter 1. In chapter 2, the high biological productivity of coral reefs in relation to microorganisms and bacterioplankton is covered. The algae occurring on the reefs and the competition with the corals for space are discribed in chapter 3. In chapter 4, the discussion includes the food and feeding mechanism of corals and the significance of coral symbionts in providing a food source. Coral reef organisms produce antibiotics which may be useful in medicine; this topic is discussed in chapter 5. Other compounds isolated from corals of pharmacological interest are discussed in chapter 6. The distribution, abundance, and ecology of corals are discussed in chapter 7. In chapter 8, the species diversity of corals is described and theoretical reasons for the diversity are given. Coral reef variations in structure found in the western Atlantic Ocean are described in chapter 9. One of the most well-known groups of invertebrates found on coral reefs is that of the holothurians (sea cucumbers); the toxic materials produced by these organisms are discussed in chapter 10. In chapter 11, the development, feeding, and behavior of the asteroids (starfishes) found on coral reefs are described,



9.11 SEA & AIR -- THE MARINE ENVIRONMENT

Williams, Jerome (U.S. Naval Academy, Annapolis, Md.), John J. Higginson, and John D. Rohrbough
Naval Institute Press, Annapolis, Md. (1973), x + 338 pp.

This book provides information that can be useful for all mariners and those who live near the oceans. This information covers weather conditions that affect the surface of the water and the speed and direction of the wind. These factors are directly related to the operation of shipping in various fields: transport, fishing, naval exercises, and rescue. The first four chapters contain descriptions of the earth's structure, the water on the earth, the air envelope around the earth, and the influence of the sun on the earth. In chapters on the ocean, the discussions include the thermal structure, fluid behavior, light and sound transmission, winds and currents, wind systems, surface currents, circulation of water masses, ice formation, and biology. In chapters on the air envelope of the earth, the following subjects are discussed: condensation and precipitation, air masses and pressure systems, tropical cyclones, and synoptic meteorology.

In the visible surface activity of the oceans, information on wind waves, tides, and other long waves is provided. The final chapter contains discussions on the relationship between the air and sea and the environmental changes that man imposes on both. A subject index is provided, and each chapter contains lists of additional reading references. SW



9.12 (1.51) (1.01111) DIURNAL PERIODICITY IN FEEDING AND THE VERTICAL MOVEMENTS OF THE ATLANTIC COD (GADUS MORHUA L.)

Turuk, T. N. (Polar Research and Planning Institute for Sea Fisheries and Oceanography (PINOR), Murmansk, U.S.S.R.)
Journal of Ichthyology 13, No. 2, 275-288 (1973)

Earlier reports indicated that the cod lives for part of a day as a pelagic fish. In the evening, with decreasing illumination of the sea, the schools of cod usually disperse. The schools of cod gather around the bottom during daylight and migrate vertically toward the surface as the light diminishes. Experienced captains of fishing boats are aware of the differences in the size of the catch in relation to the time of the day when seeking fish. In this present study, attempts were made to establish the reasons for the daily vertical migrations of the cod from the bottom to the surface and back.

At seven locations in the regions of Labrador and Newfoundland 24-hour stations were set up, and trawling operations were carried out in those locations during the day-night interval. The netted cod were counted and measured; the fish were also weighed and dissected. The stomach contents were analyzed for identity of species preyed upon and weight. The results of the investigation indicate that the daily vertical movements are governed by feeding patterns. When feeding on pelagic organisms such as capelin and amphipods (Themisto spp.) the cod descends during the day and ascends into the pelagic zone at night. When feeding on benthic food, the cod descends to the bottom at night and ascends toward the surface during the day. When feeding on pelagic organisms, the feeding rate increases at night



9.12 (1.83)(1.89) ABALONES AND SEA URCHINS IN AN AREA INHABITED BY SEA OTTERS

Lowry, L. F., and J. S. Pearse (Div. of Natural Sciences, University of California, Santa Cruz, CA 95064 U.S.A.)
Marine Biology 23, No. 3, 213-219 (1973)

The purpose of this study is to determine the long-term effects of intense sea-otter foraging on sea-urchin and abalone populations. The marine preserve off Hopkins Marine Station, Pacific Grove, Calif., was selected as the site for this study. Abalones and sea urchins are part of the subtidal fauna in the kelp beds of this preserve, and sea otters have foraged the area for the past 10 years. Furthermore, the sea otter density in this area is estimated to be near the maximum supportable density. The densities of the abalones and sea urchins are considered substantial, but they are probably much lower than before the return of the sea otter (the sea otters were nearly exteminated during the 19th century).

The adult abalones were found clustered in crevices where they probably feed mainly on drift algae, rarely foraging in the open. The abalones tended to occur in larger crevices than did the sea urchins. There may be considerable interaction and competition among these large, invertebrate, crevice-inhabiting herbivores.
[3 figures, 3 tables, 40 references] FTP

9.11 (9.12) ABUNDANCE OF PELAGIC FISH DURING THE 19TH AND 20TH CENTURIES AS RECORDED IN ANAEROBIC SEDIMENT OFF THE CALIFORNIAS

Soutar, Andrew, and John D. Isaacs (Scripps Institute of Oceanography, University of California at San Diego, La Jolla, CA 92037)
Fishery Bulletin 72, No. 2, 257-273 (Apr. 1974)

Anaerobic sediment preserves a chronographic record of the bioclimatological conditions in coastal seas. Of the myriad elements within this record, the accumulation of pelagic-fish debris is of particular interest. The deposition of scales of the Pacific sardine, the northern anchovy, the Pacific hake, the Pacific saury, and the Pacific mackerel in the sediment of the Santa Barbara Basin, Alta California, and the Soledad Basin, Baja California, is generally in accord with available population estimates. The relation between scale deposition and population, when applied to the sedimentary record over the past 150 yr, suggests that major pelagic-fish productivity between 1925 and 1970 was substantially below pre-1925 levels.
[11 figures, 8 tables, 27 references] Authors' abstract

9.12 THE ROLE OF TIDAL MARSHES IN THE PRODUCTIVITY OF COASTAL WATERS

De la Cruz, Armando A. (Dept. of Zoology, Mississippi State University, P.O. Drawer Z, Mississippi State, MS 39762)
Association of Southeastern Biologists Bulletin 20, No. 4, 147-156 (Oct. 1973)

This work is part of an overall program to assess the role of marshes in the productivity of coastal waters. Studies are being carried out on (1) primary production of marshlands, (2) formation of detritus from marsh plants, (3) nutritive value of marsh plants and their detritus, (4) transportation of detritus by tides, and (5) feeding habits and food chain relationships of estuarine and marine fauna. This paper reports on a study of an area of marshland located on the northwest side of St. Louis Bay, Hancock County, Miss. Information is presented on the primary productivity of the salt marsh and comparison is made of its productivity with that of similar tidal marshes in other states. Decomposition rates for cord grass, needlerush, and other species of marsh plants and of mangrove leaves are given. Some data are presented on the transport of detritus. Data are given on the caloric content and elemental (C, N, and P) composition of selected species of marsh plants and on the caloric content of the detritus of selected species of plants. The various detritivores of the salt marsh and mangrove swamp estuaries are listed.

The authors conclude that the secondary productivity of coastal waters manifested in the productive fisheries and shellfisheries is dependent upon the biological processes occurring on the marshes.
[6 figures, 8 tables, 39 references] FTP

9.1 (1.89)

and in chapter 12 the damage to coral reefs by the starfish crown of thorns, is discussed.

Each chapter is provided with a list of references; there are also author, systematic, and subject indexes. SW

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9.11 SELF DESCENDING AND SURFACING WATER DEVICE

White, Elmer (94 E. Marathon Rd., Altadena, Calif.) (pat.)
U.S. Patent 3,800,346
Official Gazette of the U.S. Patent Office 921, No. 1, 19 (Apr. 2, 1974)

This is a self descending and surfacing water device for deploying instruments (such as a bathythermograph). FTP

9.12 (1.51)(1.01111)

and decreases during the day. When benthic organisms predominate in the food of the cod, the fullness of its stomach varies in the course of the day without any definite rhythm. If benthic food is secondary such as the sand lance, the cod feeds on it mainly during the daylight. This type of migration may be predicted and fishing may be rationally conducted on the basis of the stomach contents of the cod which are caught and examined. The stomach contents are greater at night or in the evening; this indicates that cod feeds most actively in darkness under natural conditions. Illumination is a factor that affects the rhythm of vertical migrations of the cod because it affects the food organisms of the cod. Since capelin is usually pelagic, ascending to the surface at night and submerging during the day, the cod feeding on capelin duplicates its daily migrations.
[8 figures, 7 tables, 24 references] SW

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9.12 HOW DO FISH HATCH

Hagenmaier, Hans E. (Inst. Zool., Rheinisch-Westfael. Tech Hochsch., Aachen, Germany)
Chemical Abstracts 80, No. 21, 118473m (May 27, 1974)

9.12 (1.51)(1.0147) A QUANTITATIVE ANALYSIS OF THE FOOD INTAKE OF NORTH SEA COD, GADUS MORHUA

Daan, N. (Netherlands Institute for Fishery Investigations, IJmuiden, The Netherlands)
Netherlands Journal of Sea Research 6, No. 4, 479-517 (Dec. 1973)

In the study of food chains in fishery research, the interrelationships of competition between species and predator-prey systems may affect the measures to conserve one commercially important species and have adverse effects on other equally important stocks. Most evaluations of these effects were based upon tentative assumptions, and more research on the subject was needed. Because cod is the most numerous predator in the North Sea and because it preys heavily on herring and other commercial species, a quantitative assessment of predator-prey relationship in this species could be indicative of all predators in the area. From 1966 to 1972 cod stomachs were sampled on research vessels throughout the year and throughout the North Sea. The northern and southern regions of the North Sea were the major areas fished; 1,725 cod stomaches were examined from the northern North Sea and 5,705 from the southern North Sea. Stomach contents from both areas indicated a gradual shift in food composition, coinciding with increasing length of the fish, from crustaceans to fish. This shift was more marked in northern area fish. Of the fish used for food by the cod, the important groups were clupeids and flatfish in the southern part and gadoids (haddock, whiting, and smaller cod) were the food of the cod in the northern part of the North Sea. There are seasonal shifts in the food composition in the stomachs; this is based partly upon the abundance of young prey fishes emerging from the nursery areas off



9.15 (0.38)(8.69) THE ENZYMATIC CONTENT OF THE VENOMS OF THE SEA NETTLE AND THE PORTUGUESE MAN-O'-WAR

Burnett, J. W., and G. J. Calton (University of Maryland School of Medicine, Baltimore, MD 21201)
Comparative Biochemistry and Physiology 47, No. 4B, 815-820 (Apr. 15, 1974)

The enzymes present in a venom are probably important in the production of some of the clinical manifestations of venom toxicosis. Other reports by the authors indicate that the action of sea nettle (Chrysaora quinquecirrha) and Portuguese man-o'-war (Physalia physalis) venoms on rat sarcoplasmic reticulum and mitochrondria is similar to that of the complex mixture of enzymes that occur in snake venoms. For this reason, a survey of the enzymes in the toxins of the sea nettle and Portuguese man-o'-war were carried out.

The nematocyst toxins of the two organisms were prepared by the authors using their own methods and the enzymes in each venom were quantitated by known methods. The protein concentration and lethal content (for adult mice) were determined by previously established procedures. The results indicated the presence of seven enzymes in sea nettle venom and six in the man-o'-war venom. Four of the enzymes, ATPase, nonspecific amino esterase, RNase, and DNase were common to the venom of both organisms. The sea nettle venom contained an acid and an alkaline protease and a hyaluronidase which were not detected in the man-o'-war venom. The ATPase and the RNase of the venoms are not identical because they have different pH optima. The man-o'-war venom had more DNase and ATPase than the sea nettle venom, but the sea nettle venom contained more RNase. The man-o'-war venom contained fibrinolysin which was absent from the sea nettle venom. No



9.15 (9.16)(1.92) CHANNEL CATFISH VIRUS

Plumb, John A. (Alabama Agricultural Experiment Station, Auburn University)
Catfish Farmer & World Aquaculture News 6, No. 3, 40-42 (May-June 1974)

Channel catfish virus (CCV) was first discovered in 1968; its geographic range lies between West Virginia and California and from Alabama to Nebraska. The disease appeared in one foreign country where fry had been imported from a southeastern state. The number of cases has not been high, but the disease has a wide range. In some cases CCV can be traced to a hatchery; in others, the source of the disease cannot be shown. It also appears sporadically in some hatcheries for 1 or 2 years and then disappears. With proper precautions the author believes the occurrence of CCV can be prevented.

The disease affects only fry or fingerling channel catfish during summer months when water temperatures are elevated. For confirmation of the disease, samples of sick fish should be examined by a qualified fishery biologist. The gross clinical signs include: hemorrhage at the base of the fins and in the skin; distended abdomen filled with clear yellowish fluid, pop-eyes, and pale gills; the kidney may be slightly swollen, pale, with small bloody areas; the liver is pale, spleen dark red, the gut is pale and empty; blood vessels in the viscera are engorged; and erratic swimming sometimes hanging head up in the water just prior to death. These symptoms are similar to other diseases.

The temperature of the water has an effect on the mortality rate of infected fish. At 15° C, neither mortality nor symptoms appear. At 20° to 25° C some deaths occur. If the temperature rises to 25° C and holds, the symptoms appear



9.15 (9.16) THE MAJOR COMMUNICABLE FISH DISEASES OF EUROPE AND NORTH AMERICA. A REVIEW OF NATIONAL AND INTERNATIONAL MEASURES FOR THEIR CONTROL

Thompson, Paul E. (1404 Namassin Rd., Alexandria, VA 22308), William A. Dill, and Gerald Moore
EIFAC Technical Paper No. 17, Supplement 1, Food and Agriculture Organization of the United Nations, Dept. of Fisheries, Via delle Terme di Caracalla, 00100 Rome, Italy (1973), vii + 48 pp.

This report presents revised versions of Report No. FI:EIFAC 72/SC II-Symp. 10 "The Major Communicable Fish Diseases of Europe and North America: A Review of Attempts at Their Control," and Report No. IF:EIFAC 72/SC II-6 "International Measures for the Control of Major Communicable Fish Diseases" submitted at the Symposium on the "Major Communicable Fish Diseases in Europe and Their Control," Amsterdam, Netherlands, Apr. 20-28, 1972.

The first part of the report contains discussions of progress in fish disease research, progress in controlling the dissemination of fish diseases, and control of livestock diseases. The major communicable fish diseases in Europe and North America are discussed in Part 2. Transmission of fish disease is discussed in Part 3. The topics in this part include whirling disease, infectious pancreatic necrosis, furunculosis and kidney disease, diseases of tropical aquarium species, and the economic consequences of fish disease. In Part 4, some reasons for lack of fish disease control are brought out. These include: lack of veterinary skills; economic affects; no central registry and reporting of disease; lack of research,

9.15 (9.16)(1.92)

and mortality increases rapidly. Reducing the temperature of the water to 18°-20° C may reduce mortality of infected fish. The CCV agent may be transmitted by incorporating it into feeds, swabbing it on the fish gills, and placing infected fish into a tank with healthy ones, or by water from a tank with infected fish flowing into a tank of healthy fish. Transmission of the virus from brood-fish to their offspring has not been demonstrated; however, transovarian transmission is suspected. In addition, survivors of CCV epidemics should not be stocked into catfish farm waters with no history of the disease.

The CCV agent is a delicate herpesvirus. It dies within 2 days in decomposing fish, but it can survive for 14 days in iced fish and for 6 months in frozen fish. On dried concrete or dry fish net, the virus dies in 1 day; in pond water it survives for 4 days at 25° C and for 28 days at 4° C. Ponds which contained diseased fish should be drained and thoroughly dried. Before discharge, enough chlorine should be added to the water to reach a level of not less than 30 p/m. The CCV agent can be isolated from infected fingerlings showing symptoms of the disease, but after mortality ceases, the virus cannot be isolated from the survivors. Consequently, the virus has not been isolated from adult fish although circumstantial evidence indicates that adults may be the primary source of the virus. The only way to control the disease is through prevention, sanitary practices, and good management.

[1 figure] SW

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9.12 (1.51)(1.0147)

the European coast in the winter. The preference of food items in the diet of the cod is related to size of prey relative to size of predator. Tables in the article give details on the identity, weight, and percentage of crustaceans and fishes found in the stomachs in relation to the size of the cod. Other tables and figures illustrate seasonal variations in stomach contents and size of cod. SW

[11 figures, 14 tables, 49 references]

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9.15 (9.16)

diagnostic techniques, and quarantine methods; and administration and enforcement difficulties. The fifth part covers preventive measures. The topics include: improved design, operation, and inspection of hatcheries; disease control in transported, traded, or imported fish; registry, reporting, and information service of diseases; and legislative aspects of fish disease. Part 6 covers disease control in international trade. The topics in this section include: the need for control measures; possible methods of control; the feasibility of inspection at source and certification; and the elements of an international control system. Part 7 gives conclusions and recommendations. Parts 8 and 9 contain references. The appendix contains a guide for preparing national legislation on control of fish diseases. SW

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9.15 (9.16) PREVENTIVE AND CURING MEDICINES FOR BACTERIAL DISEASES OF FISH

Okubo, Teruo (Eisai Co., Ltd.) (pat.)
Japan. Kokai 73 56,182 (Aug. 9, 1973)
Chemical Abstracts 80, No. 17, 91408e (Apr. 29, 1974)

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9.15 (0.38)(8.69)

correlation of the enzymatic content with the severity of the cutaneous sting was made. A table in the article shows the enzymes that were detected in the venom of each organism, the substrate upon which each enzume was active, the optimum pH, the quantities found, and the $LD_{100}$ for mice tested intravenously. SW

[1 table, 29 references]

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9.15 (9.19) THE EFFECTS OF ENVIRONMENTAL STRESS ON OUTBREAKS OF INFECTIOUS DISEASES OF FISHES

Snieszko, S. F. (Eastern Fish Disease Laboratory, Leetown, Route 1, Box 17A, Kearneysville, WV 25430)
Journal of Fish Biology 6, No. 2, 197-208 (Mar. 1974)

Infectious diseases of fishes occur when susceptible fishes are exposed to virulent pathogenic organisms under certain conditions of environmental stress. However, little research work has been carried out to relate the effect of pollution on the outbreaks of diseases of fishes. Therefore, in this report, the author selected examples from the literature and showed the coincidence of infectious diseases in fishes with stress caused by water temperature, eutrophication, sewage, metabolic products of fishes, industrial pollution, and pesticides. FTP

[1 figure, 4 tables, 50 references]

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9.15 (9.16)(1.92) MORONOMYCIN FOR FISH GROWTH AND DISEASE

Hatai, Kishio (Sankyo Co., Ltd.) (pat.)
Japan. Kokai 73 56,183 (Aug. 9, 1973)
Chemical Abstracts 80, No. 17, 91407d (Apr. 29, 1974)

9.15 OCEAN POUT PARASITES

Sheehy, Daniel J., Michael P. Sissenwine, and Saul B. Saila (Marine Experiment Station, University of Rhode Island, Kingston, RI 02881)
Marine Fisheries Review 36, No. 5, 29-33 (May 1974)

Ocean pout, Macrozoarces americanus, was marketed for human consumption during the period 1943-44. However, the presence of parasitic lesions in the fillets caused a decline in the consumption of fillets from these fish. Eventually ocean pout was relegated to the production of byproducts. The protozoan responsible for the lesions is the microsporidian Plistophora macrozoarcidis. There has been no indication that the parasite may be transmitted to mammals as a result of consumption of the infected fish fillets. This paper reports on the incidence of the microsporidian parasites in ocean pout from waters off Rhode Island.

Approximately 600 ocean pout were collected from two locations in Rhode Island Sound. Each specimen was skinned and filleted. The fillets were examined for visual lesions resulting from parasitic infections by the microsporidian, Plistophora macrozoarcidis.

Of the specimens examined, 29 percent had parasitic lesions, while 7.5 percent had more than a single lesion. The incidence of infection was shown to be significantly correlated with the age, length, and weight of the specimens, although most of the variability in the infection rate remains unexplained. No statistically significant differences in the rate of infection between sexes or areas sampled were determined when the data were adjusted for variations in length.



9.16 REARING OF PLAICE (PLEURONECTES PLATESSA) LARVAE TO METAMORPHOSIS USING AN ARTIFICIAL DIET

Adron, J. W., A. Blair, and C. B. Cowey (Institute of Marine Biochemistry, St. Fittick's Road, Aberdeen AB1 3RA, Scotland)
Fishery Bulletin 72, No. 2, 353-357 (Apr. 1974)

The rearing of marine flatfish from egg to metamorphosis and subsequently to more adult stages was achieved under laboratory or hatchery conditions using live food (Artemia salina) about 10 yr ago. The experimental animal was plaice, Pleuronectes platessa. Since then other flatfish (lemon sole, Microstomus kitt; Dover sole, Solea solea; and turbot, Scophthalmus maximus) have been similarly reared to metamorphosis, using either the same food organism for sole or a combination of organisms such as rotifers followed by Artemia for turbot.

While such methods have been applied successfully on a pilot scale the ability to rear these fish on an artificial diet may confer certain advantages such as: (1) the ability to change the composition of the food and so ultimately arrive at a composite ration approaching the optimal requirement of the larva; (2) continuity of a food supply of standard quality; (3) elimination of the need to wean metamorphosed larvae from a natural to an artificial food.

The present paper describes a partially successful attempt to rear plaice from egg to metamorphosis using artificial food under small scale laboratory conditions. The overall survival rate to metamorphosis was of the order of 20%. This compares with a survival rate of 38% in control larvae fed Artemia in a similar tank system.



9.16 (9.14) MARINE FISH CULTURE IN BRITAIN VIII. A MARINE ROTIFER, BRACHIONUS PLICATILIS MULLER, AND THE LARVAE OF THE MUSSEL, MYTILUS EDULIS L., AS FOODS FOR LARVAL FLATFISH

Howell, B. R. (Fisheries Laboratory, Port Erin, Isle of Man, United Kingdom)
Journal du Conseil 35, No. 1, 1-6 (June 1973)

Although brine shrimp are easy to raise as food of cultured fish the nauplii of brine shrimp are too large to be used for feeding the larval stages of lemon sole and turbot. Alternative organisms that may be acceptable to smallmouthed fish larvae were investigated.

The rotifer B. plicatilis and the trochophore larvae of the mussel were compared with the nauplii of brine shrimp as foods for larval plaice and sole. The rotifer was isolated from plankton in outdoor seawater tanks and fed on the alga Dunaliella tertiolecta. The cultures of the rotifer were maintained in 30-liter tanks between 15° and 20° C provided with continuous illumination. The rotifers were gathered in a 60-µm mesh net. The trochophore larvae of mussels were obtained by holding the adults in running water, containing algae as feed, at 10°-12° C for about 2 weeks. Then they were stimulated by violent shaking for 2-3 min. When they were placed in lightly aerated static seawater at 14°-15° C following the shaking, spawning occurred within 12 h, and within 24-48 h trochophore larvae developed. These were concentrated by means of a 25-µm mesh nylon net. The value of the rotifer as a larval fish food was demonstrated in the tests. The growth rate of plaice and sole larvae was less on rotifers than on salt brine larvae, but the survival rate was equally good on both foods. Furthermore, the rotifer supported development of the fish larvae to metamorphosis. The trochophore larvae of



9.16 (1.3) SALMON--FUTURE HARVEST FROM THE ANTARCTIC OCEAN?

Joyner, Timothy, Conrad V. W. Mahnken, and Robert C. Clark, Jr. (Northwest Fisheries Center, National Marine Fisheries Service, NOAA, 2725 Montlake Blvd. E., Seattle, WA 98112)
Marine Fisheries Review 36, No. 5, 20-28 (May 1974)

It is estimated that the potential annual yield of krill from the ocean surrounding the Antarctic continent is about 100 million tons. Krill is a small crustacean of the species (Euphasia superba) that looks like a small shrimp. The Japanese and Russians are working on techniques to process krill into a palatable food product. Nevertheless, harvesting krill is a difficult and expensive undertaking. The authors suggest that perhaps this resource could be utilized for the production of food by introducing animals higher in the food chain to the Antarctic waters. These animals could feed on the krill, and then they might be harvested for food for man. The authors discuss the possibility of introducing salmon into the Antarctic seas on a scale sufficient to generate a significant commercial fishery.
[9 figures, 1 table, 14 references] FTP

9.16

The preparation of the artificial diet is described. The main protein component was freeze dried cod muscle, and the diet contained 70.7% crude protein, 9.7% lipid, 7.9% ash, and 5% digestible carbohydrate.

This food in particle sizes ranging from 180 to 355 μ was introduced automatically into the inflowing water of a cylindrical tank containing 200 yolk sac larvae. Water temperature was 10±2° C. After about 13-14 days a relatively high larval mortality occurred, leaving approximately 70 established feeding larvae. Unfed larvae in an identical control tank did not survive beyond this time.

Once feeding had been established larval mortalities were occasional and sporadic. Thirty-five days after commencement of the experiment some larvae began to metamorphose, and 56 days from the start some 35 metamorphosed fish were transferred to a separate tank. These fish have since continued to feed and grow on the same diet.

[2 figures, 1 table, 11 references] Extracted

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9.15

The incidence of lesions in the anterior ventral portion of the fillets was significantly higher than elsewhere, suggesting the possibility of removing the highly infected portions of the fillets as an inexpensive means of reducing the level of infection of the resulting product.

[4 figures, 5 tables, 12 references] FTP

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9.17 (9.6) A GLOSSARY OF ECOLOGICAL TERMS FOR COASTAL ENGINEERS

Hurme, Arthur K. (compiler) (Ecology Branch, U.S. Army Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, VA 22060)
Miscellaneous Paper No. 2-74, U.S. Coastal Engineering Research Center, Fort Belvoir, VA 22060 (Mar. 1974), 18 pp.

Technical ecological terms are being used increasingly since more of the public has become aware of man's effects on the environment. Many of the terms have lost their original meaning because of common usage of people who are unfamiliar with ecology. This glossary is designed to provide the coastal engineer with clear definitions of commonly used coastal ecology terms. There is a list of references given which provide for precise definitions of specific terms that might be used in a limited sense.

[8 references] SW

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9.16 (9.14)

mussel gave much poorer growth and survival of plaice and sole larvae, and none developed to metamorphosis. The rotifer is easy to culture at high densities under laboratory conditions. Its use as a substitute for brine shrimp nauplii in commercial fish-culture enterprises depends upon the development of a high yield, inexpensive, and reliable mass culture system.

[6 figures, 1 table, 15 references] SW

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9.17 ARTIFICIAL REEFS FOR TEXAS

Anonymous
Sea Grant Program TAMU-SG-73-214, prepared by the Industrial Economics Div. of Texas A. & M. University and the Texas Coastal and Marine Council, P.O. Box 13407, Austin, TX 78712 (Mar. 1974), 39 pp.

This report is a summary of the state of the art in the construction of artificial reefs. The topics covered were (1) Materials--the nature, types, limitations, sources, and costs; (2) Site location--the criteria used in locating reef sites to avoid interference with other uses, minimize user risks, and enhance usability; (3) Project financing--possible arrangements among fishermen, industry, government, and civic groups to finance construction and maintenance of reefs; (4) Legal and institutional--the legal issues involved in and government requirements for the construction of artificial reefs. A list of 13 persons and agencies that are knowledgeable in artificial reef construction is included.

[Illustrated; 25 references] FTP

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9.15 ANTIMYCIN A, A PISCICIDAL ANTIBIOTIC

Lennon, Robert E., and Claude Vezina (Fish Wildl. Serv., Bur. Sport Fish. Wildl., La Crosse, Wis.)
Chemical Abstracts 80, No. 21, 119176d (May 27, 1974)

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9.15 INFECTIOUS PANCREATIC NECROSIS VIRUS OCCURENCE AT A HATCHERY IN ALBERTA

Yamamoto, T. (Dept. of Microbiology, University of Alberta, Edmonton, Alta., Canada)
Journal of the Fisheries Research Board of Canada 31, No. 4, 397-402 (Apr. 1974)

A high incidence of infectious pancreatic necrosis (IPN) in brook and rainbow trout was found by examination of the kidney tissue of yearling and older fish. The virus was isolated most frequently from the kidneys of the two species (the kidney, spleen, cecum, feces, and gonads were examined). Thus, the author concludes, the examination of peritoneal washes and feces is not adequate for the detection of IPN carrier fish.

[8 figures, 5 tables, 15 references] FTP

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9.17 OPTIMAL CONTROL OF A PREY-PREDATOR SYSTEM
(9.19)

Goh, Bean San (Dept. of Mathematics, University of Western Australia, Nedlands, W. A., Australia), George Leitmann (University of California, Berkeley, Calif.) and Thomas L. Vincent (University of Arizona, Tucson, Ariz.)
Mathematical Biosciences 19, No. 3/4, 263-286 (1974)

This article was presented to illustrate the use of optimal control theory to obtain the best strategy for the control of a prey-predator system. One control variable is the rate of release of laboratory bred predators or prey. The other type of variable is the rate of application of an insecticide.

An earlier report indicated that pest management is the best approach to pest control. Pest management is the rational combination of all possible pest control procedures. The results of a study of predator-prey relationship using a mathematical model indicated the following control procedures. If a predator-prey system is disturbed from a steady state and (1) if the population of both is at low levels, the control variable should be to increase the rate of release of the prey (or pests) to a maximum rate. (The case of controlling the predator-prey system by releasing the prey [or pest] is plausible when the rationale behind it is seen to be the prevention of a collapse of the predator population followed by a pest outbreak); (2) if the predator population is low and the prey population is increasing, the control variable should be to increase the rate of release of the predators to maximum; and (3) if both prey and predator populations are large, the



9.17 WHALE CAMPAIGN MANUAL
(1.953)

Anonymous
Friends of the Earth Ltd., 9 Poland St., London, United Kingdom (June 1972), 93 pp.
Aquatic Sciences & Fisheries Abstracts 4, No. 4, 5, Abstract No. 4Qr029M (Apr. 1974)

This book contains information on the ethnology and ecology of whales, and on whaling operations. A history of the International Whaling Commission is presented and discussed in relation to the decline of the whale population. Tables are presented containing estimates of past and current whale populations of commercial importance. Past and present commercial uses of whales are also tabulated. The authors discuss the policy of the United Kingdom (UK) on exploitation of whales. The authors also suggest the decision that the UK should make to assist in the conservation of whales. An action guide in this regard is presented. SW



9.19 FATE OF NITROGEN UNDER INTENSIVE ANIMAL FEEDING

Viets, Frank G. (Agricultural Research Service, U.S. Dept. of Agriculture, Fort Collins, CO 80521)
Federation Proceedings 33, No. 5, 1178-1182 (May 1974)

Manure and bedding from livestock and poultry have been regarded in the past as assets to resupply the soil nutrients removed by crops. In contrast, the wastes from large-scale highly concentrated cattle and poultry operations cause problems of disposal and can reduce the quality of air and water. In many areas manure has become a liability because: large volumes accumulate from great numbers of animals on a small area, the feeds used in the feedlot were produced in other areas, the local land is not usable for beneficial disposal of the wastes which contaminate the environment, and the feeder has no interest in the land that produced the feed. A major component of the feedyard waste is nitrogen in various compounds, and disposal of the compounds is complex; many chemical and microbial changes in these compounds affect soil, water, and air. Nitrogen disposal problems have been aggravated by three trends: (1) manure has become higher in total N because of greater availability of protein from plants and other sources; (2) we are increasingly becoming a nation of animal rather than vegetable protein eaters; and (3) livestock feeding is concentrated into units with high animal densities per acre; for instance, two feedlots in Colorado have been reported to have capacities of 100,000 head of cattle with densities of about 360 head per acre.



9.19 AMMONIA DETOXIFYING MECHANISMS OF RAINBOW TROUT ALTERED BY DIETARY DIELDRIN

Mehrle, Paul M. (Fish-Pesticide Research Lab., Bur. Sport Fisheries and Wildlife, U.S. Dept. of the Interior, Columbia, MO 65201), and Richard A. Bloomfield
Toxicology and Applied Pharmacology 27, No. 2, 355-365 (Feb. 1974)

Ammonia is one of the most common toxicants discharged into the aquatic environment, and it is of serious concern in fish toxicology. The detoxification and maintenance of low, nontoxic levels of ammonia in fish are controlled by the following biosynthetic reactions:

$$\alpha\text{-oxoglutarate} + NADH + H^+ + NH_4^+ \underset{\text{glutamate dehydrogenase}}{\rightleftharpoons} \text{glutamate} + NAD + H_2O$$

$$\text{glutamate} + ATP + NH_4^+ \underset{\text{glutamine synthetase}}{\rightleftharpoons} \text{glutamine} + ADP + \text{orthophosphate}$$

Both reactions occur in the brain; the first also occurs in the liver. Regulation of these detoxifying mechanisms is extremely important in maintaining critical, nontoxic, levels of ammonia in fish. The present study was carried out to determine the effects of dieldrin on ammonia detoxifying mechanisms and brain amino-acid metabolism of rainbow trout. Dietary dosages of dieldrin of 14, 43, 143, and 430 µg/kg body weight per day were administered to rainbow trout for

9.19 ULTRASTRUCTURAL CHANGES IN THE LIVER AFTER LONG-TERM DIET OF MERCURY-CONTAMINATED TUNA

Chang, Louis W. (Dept. of Pathology, University of Wisconsin, Madison, WI 53706), and Seiya Yamaguchi
Environmental Research 7, No. 2, 133-148 (Apr. 1974)

Commercially available tuna fish (flakes) containing 0.3-0.5 p/m of mercury was fed to cats for up to 11 months. The liver and brain of the cats were then examined for any pathological changes. In this paper, the authors discuss the examination of the liver of the cats; subsequent papers will deal with the examination of the brain. The total amount of tuna consumed by each test animal during the entire experimental period (11 mo) was 21.1 kg on the average; the total amount of mercury intake by the end of the test period averaged 6.3 mg per animal. After 7-11 months some of the cats showed neurological disturbances. Histological examination showed extensive proliferation of the smooth endoplasmic reticulum in the hepatocytes and dilatation of the rough endoplasmic reticulum, evidence of the detoxification attempt of the liver. Also, there was floccular degeneration of the hepatic mitochondria.

In their concluding remarks, the authors state that this study clearly indicates that excessive consumption of fish containing 0.5 p/m of mercury (FDA allowable level) may still constitute a medical risk to general health. However, the authors continue, in view of the amount of fish consumed by the test animals in this study (about 2 oz per day per cat; equivalent to more than 1 lb of fish per day per adult man), one should not be alarmed concerning the general consumption of fish at this time. Further studies are needed.
[12 figures, 47 references] FTP

9.19

240 days (The dosages corresponded to 0.36, 1.08, 3.6, and 10.8 µg dieldrin per gram of food, respectively.).

In fish from the lowest three dosage levels, the dieldrin residues in the whole body were comparable to those found in fish from the aquatic environment. The concentrations of the amino acids associated with ammonia detoxifying mechanisms (aspartate, glutamate, and alanine) were significantly altered, as were the enzymes related to their metabolism. The glutamate dehydrogenase activity of the brain was decreased by all doses of dieldrin; whereas this activity level in the liver and the brain glutamine synthetase activity were stimulated by all treatment doses. The ammonia detoxifying mechanisms of the rainbow trout seemed to be very sensitive to dieldrin; the "no-effect" dosage was below 14 µg of dieldrin per kilogram of body weight per day (0.36 µg/g food).

The results suggest that fish carrying body burdens of dieldrin would be less tolerant to increased levels of ammonia in water. Thus, it appears that dieldrin may induce subtle, biochemical effects in rainbow trout that may alter their adaptability and survival in the aquatic environment.
[3 figures, 2 tables, 18 references] FTP

9.17 (9.19)

control variable should be the rate of application of a nonpersistent insecticide. This control policy is dependent on the population levels of the prey and predator; knowledge of only the prey population level will provide inadequate results. The explanations of pest-predator control are developed with accompanying mathematical expressions and equations.
[8 figures, 17 references] SW

9.19

Pathways of nitrogen loss consist of mechanical removal, runoff into streams, percolation, and volatilization of $N_2$ (ammonia and amines). For these reasons, feedlot facilities should be designed to keep the wastes out of surface waters. Large amounts of ammonia can evaporate into the air and be absorbed by surface water and plant leaves with beneficial results. Reports by other workers indicate that continuously used feedyards with intact manure packs and moderate to high animal densities do not actively pollute groundwater. However, nitrate does accumulate in waters under some feedlots. This type of pollution may occur under either of the following conditions: a newly established feedlot before a relatively impermeable manure pack has developed, or a feedlot is abandoned, or a feedlot is used only a part of the year, or a feedlot with a low density. Applying manure and urine from feedlots to croplands in a way that does not create a new pollution hazard is the most beneficial use of the nitrogen.
[24 references] SW

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9.17 METHOD OF ANCHORING ARTIFICIAL SEAWEED FORMED BY SYNTHETIC ELONGATED, FLEXIBLE, IN WATER BUOYANT ELEMENTS SECURED TO ANCHORING BODIES, TO A FLOOR UNDERNEATH A BODY OF WATER, AND ARTIFICIAL SEAWEED TO BE ANCHORED BY THIS METHOD

Edwards, Keith W.; assignor to Shell International Research Maatschappij N.V., The Hague, Netherlands (pat.)
Canadian Patent 943,354
Patent Office Record [Canada] 102, No. 11, 905 (Mar. 12, 1974)

The invention deals with a method for anchoring artificial seaweed to a seafloor. FTP

9.19 RAPID SCREENING METHOD FOR ANALYSIS OF CHLORINATED PESTICIDE AND POLYCHLORINATED BIPHENYL RESIDUES IN FISH

Erney, D. Ronald (Food and Drug Administration, 1560 E. Jefferson Ave., Detroit, MI 48207)
Journal of the Association of Official Analytical Chemists 57, No. 3, 576-579 (May 1974)

A rapid method was developed for screening for chlorinated pesticide and PCB residues in fish, using miniature columns for sample cleanup and separation of PCB, DDT, and analogs prior to gas-liquid chromatography (GLC) determination. The fish sample is ground and dried with anhydrous $Na_2SO_4$, packed into a chromatographic column, and extracted with petroleum ether. The extract is subjected to preliminary cleanup on miniature Florisil columns, and PCB's, DDT, and analogs are further separated on miniature columns of silica gel. GLC analyses of a variety of fish samples by the proposed method and by the Pesticide Analytical Manual method (currently used by the Food and Drug Administration) gave comparativer results. The proposed method is rapid, economical, and applicable to routine analysis of fish samples.
[1 table, 10 references] FTP



9.19 PESTICIDE AND MERCURY LEVELS IN BEAR

Benson, W. W., Joe Gabica, and John Beecham (Idaho Community Study on Pesticides, Dept. of Agriculture Laboratory, 2120 Warm Springs Ave., Boise, ID 83702)
Bulletin of Environmental Contamination and Toxicology 11, No. 1, 1-4 (Jan. 1974)

The pesticide and mercury levels of the tissue of black bear collected during October and November 1972 in Idaho were determined. Black bear are hunted as game animals and their meat is eaten by humans. The analyses for pesticides were made on the fat of six bears and on the muscle tissue of two others. Analysis for mercury was made on the muscle, fat, and hair of five bears, on the muscle and fat of two other bears, and on the muscle of another two bears.

The mercury level for the muscle of the black bear ranged from 40 to 171 ppb (parts per billion); for the fat, 48 to 120 ppb; and for the hair, 110 to 275 ppb. Total DDT level for the muscle of the black bear ranged from 0.374 to 1.382 ppb and for the fat ranged from 0.320 to 2.899 ppb. The average levels of residues of pesticides and mercury were well below the maximum tolerances permitted in domestic livestock by the Food Drug and Cosmetic regulations.
[1 table, 9 references] FTP



9.19 (3.4) REDUCTION OF MERCURY IN SABLEFISH (ANOPLOPOMA FIMBRIA) AND THE USE OF THE TREATED FLESH IN SMOKED PRODUCTS

Teeny, F. M., Alice S. Hall, and E. J. Gauglitz, Jr. (Pacific Fishery Products Technology Center, National Marine Fisheries Service, NOAA, Seattle, WA 98112)
Marine Fisheries Review 36, No. 5, 15-19 (May 1974)

A significant number of sablefish (Anoplopoma fimbria) caught in certain areas off the west coast of North America have a mercury content in the flesh that exceeds the 0.5-parts per million guideline established by the United States Food and Drug Aministration. This study was conducted to determine the feasibility of cysteine treatment to reduce the mercury content of sablefish and of subsequent utilization of the treated flesh in preparing hot-smoked products. This fish tissue was extracted with water containing cysteine hydrochloride in concentrations up to 1.0 percent.

When comminuted flesh was extracted with 1.0 percent cysteine solutions, up to 80 percent of the mercury present initially in the flesh was recovered in the wash solutions. The amount of mercury that was removed from the flesh was related to: (a) pH of the cysteine-tissue mixture, (b) concentration of the cysteine solution, (c) volume of extracting solution, (d) number of extractions, (e) contact time, (f) processing temperature, and (g) tissue particulate size. Smoked products of good texture and flavor were prepared from the cysteine-treated flesh. Yields (dry basis) of 96, 81, and 73 percent were obtained as smoked products prepared from chunks, slices, and comminuted flesh, respectively.
[4 figures, 4 tables, 5 references] Authors' abstract



9.19 GEOTHERMAL SOURCES AND DISTRIBUTION OF MERCURY IN HAWAII

Siegel, S. M., B. Z. Siegel, and A. M. Eshleman (University of Hawaii, Honolulu, HI 96882), and K. Bachmann (Univ. of South Florida, Tampa, FL 33620)
Environmental Biology and Medicine 2, No. 2, 81-89 (1973)

This progress report on the study of mercury in the Hawaiian volcanic areas presents some data on the sources and distribution of mercury in the general environment. Mercury is ubiquitous in the Hawaiian environment, and relatively high levels of the element were found in the air, water, rainfall, soils, rocks, and biological materials from the islands of Hawaii, Maui, and Oahu. Mercury contamination from industrial sources is unlikely inasmuch as no industries in Hawaii use or discharge significant quantities of mercury. The sources of mercury in Hawaii appear to be geothermal--the present levels reflect the volcanic origin of the islands and the atmospheric dispersal of gaseous and particulate mercury from the active volcanisms of the island of Hawaii.

The mercury level in the igneous rocks ranged from 16 to 1,100 ppb (parts per billion); in the soils and sediments from 20 to 305 ppb; and in the waters from "not detected" to 40 ppb. Mercury in Hawaiian plants ranged from 13 to 310 ppb. Atmospheric samples contained 0.73 to 40.7 $\mu g/m^3$ of mercury.
[6 figures, 9 tables, 16 references] FTP

9.19 BEHAVIORAL ALTERATIONS IN A SIMPLE PREDATOR-PREY SYSTEM DUE TO SUBLETHAL EXPOSURE TO MERCURY

Kania, Henry J. (Savannah River Ecology Laboratory, Aiken, S.C.), and James O'Hara
Transactions of the American Fisheries Society 103, No. 1, 134-136 (Jan. 1974)

It has been suggested that subtle effects of exposure to sublethal levels of pollutants may cause "ecological death" by altering an animal in such a way that it would be more likely to fall prey to some other environmental hazard. Earlier work has demonstrated such effects on fish for several pesticides and various metals. In the present study the researchers examined the effects of sublethal concentrations of mercury on a simple predator-prey relationship. Wild mosquitofish were used as the prey species and bass were used as the predator species. A test system, involving experimental tanks with a deep and a shallow section was used. The bass occupied the deep section and the mosquitofish the shallow shelf. The bass would prey on the mosquitofish that ventured off the shelf. The rate of removal of the mosquitofish by the bass and the population levels attained served as a measure of the effects of the treatment. The treated mosquitofish were exposed to 0.005, 0.01, 0.05, or 0.1 p/m of $Hg^{++}$ (as $HgCl_2$) for 24 h; the mortality of the mosquitofish during this treatment was no higher than that in the controls. The mosquitofish exposed to 0.005 p/m of $Hg^{++}$ were not affected, that is, their ability to avoid predation by the bass was not impaired. The mosquitofish exposed to 0.01, 0.05, and 0.1 p/m $Hg^{++}$ showed impaired ability to avoid predation by the bass. The degree of impairment correlated positively with the level of exposure to mercury.
[1 figure, 1 table, 7 references] FTP

9.19 CHANGES IN THE AMOUNT AND PROPORTIONS OF DDT AND ITS METABOLITES, DDE AND DDD, IN THE MARINE ENVIRONMENT OFF SOUTHERN CALIFORNIA, 1949-72

MacGregor, John S. (Southwest Fisheries Center, National Marine Fisheries Service, NOAA, P.O. Box 271, La Jolla, CA 92037)
Fishery Bulletin 72, No. 2, 275- 293 (Apr. 1974)

This paper is about the contamination of the ocean and its biota off southern California by the pesticide DDT.

Between 1949 and 1970, total DDT increased in the ocean off southern California. The major source of this insecticide apparently was wastes discharged into the Los Angeles County sewer system by a major manufacturer of DDT.

As measured in the myctophid fish, Stenobrachius leucopsarus, p,p′ DDT and p,p′DDD increased for several years until metabolism, excretion, and dispersion equalled input, at which point the content of these CHC's [chlorinated hydrocarbons] stabilized in the fish.

The more persistent, less easily metabolized p,p′DDE continued to increase in S. leucopsarus throughout the time period under study. The amount of p,p′DDE decreased with distance from the sewer outfall.

During the earlier years the abundance of the other analogs in decreasing order was p,p′DDT, p,p′DDE, and p,p′DDD. During the later period through 1970, the more persistent p,p′DDE became more abundant than p,p′DDT. Following cessation of dumping, in 1970, p,p′DDD became more abundant than p,p′DDT in the myctophids and most of the other fish species tested.
[12 figures, 5 tables, 25 references] Extracted

9.19 THE FATE OF 2-,3-, AND 4-CHLOROBIPHENYL FOLLOWING INTRAVENOUS ADMINISTRATION TO THE THORNY SKATE (RAJA RADIATA) AND THE WINTER SKATE (RAJA OCELLATA)

Zinck, M. E., and R. F. Addison (Fisheries Research Board of Canada, Marine Ecology Laboratory, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada)
Archives of Environmental Contamination and Toxicology 2, No. 1, 52-61 (Mar. 1974)

Polychlorinated biphenyl (PCB) residues in animals are usually not identical to the commercial materials. Apparently there is some selectivity in the absorption, metabolism, or excretion of the PCB components. Because little information is available on the fate of individual PCB components, the present study was carried out to determine the fate of three chlorobiphenyls following their intravenous administration to thorny and winter skate fish. The three PCB's used were 2-, 3-, and 4-chlorobiphenyl; the first and last are major components of Aroclor 1221, and the second is a minor component. All three are probably minor components of more highly chlorinated PCB mixtures.

Following administration of the PCB's to the skate, the 3-chlorobiphenyl cleared more rapidly than did the other two isomers from the plasma of the skate. All three compounds accumulated in other tissues of the skates, primarily the muscle and liver; the amount accumulated varied from fish to fish. The amount of 3-chlorobiphenyl remaining in the skates was consistently less than that of the other two compounds. All three isomers were excreted rapidly from the winter skate following administration; the 3-chlorobiphenyl was excreted more rapidly than the 2- and 4-chlorobiphenyls.
[2 figures, 2 tables, 13 references] FTP

9.19 (9.4) IMCO/FAO/UNESCO/WMO/WHO/IAEA/UN JOINT GROUP OF EXPERTS ON THE SCIENTIFIC ASPECTS OF MARINE POLLUTION (GESAMP) - REPORT OF THE FIFTH SESSION, VIENNA, 18-23 JUNE 1973

Anonymous
GESAMP V/10 (Oct. 1973), 87 pp. (Available from the sponsoring agencies listed in the title.) [In English, French, Russian, and Spanish]

This is the report of the fifth session of an advisory body (GESAMP) of specialized experts nominated by the sponsoring agencies: Inter-Governmental Maritime Consultative Organization (IMCO), Food and Agriculture Organization (FAO), United Nations Educational, Scientific and Cultural Organization (UNESCO), World Meteorological Organization (WMO), World Health Organization (WHO), International Atomic Energy Agency (IAEA), and the United Nations (UN). The task of the advisory body is to provide scientific advice on marine pollution problems to the sponsoring agencies and to the Intergovernmental Oceanographic Commission (IOC) of UNESCO. The contents' titles of the report include: Identification of Pollutants of International Significance, Principles for Developing Coastal Water Quality Criteria, Scientific Problems Related to Marine Pollution Monitoring Systems, Environmental Effects of Activities Carried Out on the Sea-Bed and Ocean Floor, Preliminary Discussion of Basic Information Required for Selection of Sites for the Disposal of Waste Into the Sea, and Other Matters. The seven annexes deal with the Agenda, List of Documents, List of Participants, Revised Review of Harmful Substances, Management of Waste Disposal, Principles for Developing Coastal Water Quality Criteria, and The Consequences of the Human Perturbation of the Deep-Sea. FTP

9.19 TOXICITY OF SYNTHETIC DETERGENTS TO FISH AND AQUATIC INVERTEBRATES

Abel, P. D. (Dept. of Biological Sciences, University of Aston in Birmingham, Gosta Green, Birmingham B4 7ET, England)
Journal of Fish Biology 6, No. 3, 279-298 (May 1974)

This article is a review of the information on the toxicity of synthetic detergents to fish and aquatic invertebrates. Detergents are acutely toxic to fish at levels between 0.4 and 40 mg/l. Environmental and biotic factors that influence toxicity of the detergent are the type and molecular structure of the detergent; the dissolved oxygen concentration of the water; species, age, and life stage of the fish; and acclimation of the fish to the detergent. Other factors of less defined or limited importance are hardness, temperature, and salinity of the water. Exposure of fish to low levels of detergents prior to or at the same time to some other poisons (pesticides) lowers the resistance of the animals to the poisons. The acute toxic effects of detergents on fish involve gill damage, destruction of the chemoreceptor organs, and damage to the epidermis and pharyngeal wall. Low levels of detergents may cause functional impairment of the chemoreceptors. When gill damage occurs extensively, the cause of death is probably asphyxia; however, lethal effects not related to gill damage have not been investigated. It is not yet known whether detergents are internal poisons. Chronic effects of detergents involve reduction in growth, egg production, fry survival, and the alteration of feeding behavior. Detergent levels as low as 0.1 mg/l interfere with growth and development in some species of fish. Although



9.19 MERCURY IN SOME CANADIAN ATLANTIC COAST FISH AND SHELLFISH

Freeman, H. C., D. A. Horne, B. McTague, and M. McMenemy (Dept. of the Environment, Fisheries and Marine Service, Halifax Laboratory, Halifax, Nova Scotia, Canada)
Journal of the Fisheries Research Board of Canada 31, No. 3, 369-372 (Mar. 1974)

The mercury content of the muscle, and in some cases of the liver and kidney, of 29 species of Atlantic coast fish and shellfish is given. The total mercury levels in all the species examined except off-shore lobsters, were less than 0.5 p/m. The levels found in two groups of lobsters were as follows: group 1 had a mean of 0.73 p/m of mercury in the tail muscle and 0.46 p/m in the claw muscle; group 2 had a mean of 0.61 p/m of mercury in the tail muscle and 0.25 in the claw muscle.
[1 table, 7 references] FTP



9.19 DETERMINATION OF TOTAL HYDROCARBONS IN SEA WATER AT THE MICROGRAM LEVEL WITH A FLOW CALORIMETER

Zsolnay, Ádám (Institut für Meereskunde, Kiel, Federal Republic of Germany)
Journal of Chromatography 90, No. 1, 79-85 (Mar. 13, 1974)

One liter of seawater is extracted with 10 ml of 1,2,2-trichlorotrifluoroethane, and the extract is concentrated to 100 µl. A 50-µl amount is injected into a high-performance liquid chromatographic system with a flow calorimeter which measures the absorbence of hydrocarbons on porous glass beads. The non-hydrocarbon material is removed by a short silica-gel column in the system. A chromatogram is obtained within 3 min; only one peak is elevated. The minimum detectable amount of hydrocarbons is 4.0±3.4 µg/l. The equipment is fairly inexpensive and can be used at sea aboard ship.
[4 figures, 1 table, 14 references] FTP



9.2 THE ECONOMIC AND SOCIAL EFFECTS OF THE FISHING INDUSTRY -- A COMPARATIVE STUDY

Anonymous
FAO Fisheries Circular No. 314 (1973), i + 17 pp. Prepared by the FAO Dept. of Fisheries, Food and Agriculture Organization of the United Nations, Rome, Italy.

One of the ways in which the primary activity of fishing can help in the development of a country's economy is through the inducements it provides for the establishment of other industries, such as the processing and distribution of fish and the manufacture of boats, gear, and other equipment. The fishing industry can contribute to the growth of the economy and help to feed growing industrialized populations. Fish as food is important because it increases the protein supply available to a developing country.

Fishery exports are vital to the existence of the economy of the developing country. These exports have a greater impact on the balance of payments of the exporting country than imports have on the payments position of the major importing countries.

The fishing industry creates employment and makes a population commercially active. This activity contributes to the gross domestic product. The most important employment occurs in the fish processing sector and boat building. The benefit to the balance of payments provided by fish product exports is modified by the necessity of importing engines, winches, rigging and other hardware required by the shipbuilding activity. Sometimes boatbuilding is delayed by a shortage of foreign exchange.

9.19 CRUDE SOAP RECOVERS MERCURY FROM WATER

Anonymous
Agric. Res. 22, No. 3, 11 (1973)
Aquatic Sciences & Fisheries Abstracts 4, No. 2, 134, Abstract No. 4Q1633G (Feb. 1974)

Crude Black liquor soap, a byproduct of the kraft paper process, is reported to be effective in reducing the mercury content of water to below 5 ppb. The emulsion of soap and water is acidified and the mercury containing solids are filtered out. The filtrate is either subjected to a mercury recovery process or buried. The best use of the solids is carried out if they are added to copper tallates or resinates which can then be used as fungicides in marine antifouling paints, wood preservatives, and similar products requiring fungicidal properties. MS

9.2

Although a country may have a fish production that is higher than local consumption, it may import certain commodities produced from species not found in the local waters. In addition, other countries which may be importing fish products to supplement local needs also may be exporters of certain fishery commodities. Fish products are not a single commodity, the study shows; in reality they are a large number of separate commodities ranging from caviar to canned pilchards. SW

9.2 (9.6) GLOBAL MARINE ATTRIBUTES

Gamble, John King, Jr. (Law of the Sea Institute, University of Rhode Island)
Ballinger Publishing Co., Cambridge, Mass. (1974), xi + 270 pp.

Because of the increasing concern about fisheries and marine pollution, and because of the (1974) United Nations Conference on the Law of the Sea, information on how the nations of the world relate to the marine environment is important. Thirty-five attributes to demonstrate relationships between 150 independent countries and the marine environment have been selected for description in this book. Some of the attributes (or characteristics) selected include: area, population, shore length, continental shelf area, fish catch, tanker fleet, merchant fleet, oil trade and exploration, number of marine related United Nations agencies to which the country belongs, actions taken in international agreements, and the withdrawal of ocean jurisdiction claimed by the country. The book consists of tables containing information on the attributes; in addition, discussion of combined attributes and rankings of individual attributes are given. Each of the paired attributes is discussed in relation to the world as a whole and to the other nations participating in the study. SW

9.19 USE OF THERMOPHILIC MICROORGANISMS FOR THE RECYCLING OF CELLULOSIC WASTES

Bellamy, W. Dexter (Corp. Res. Dev., Gen. Electric Co., Schnectady, N.Y.)
Chemical Abstracts 80, No. 20, 112250q (May 20, 1974)

9.19 ENVIRONMENTAL CONTAMINATION BY ORGANOCHLORINE PESTICIDES. VI. INSECTICIDE AND PCB [POLYCHLORINATED BIPHENYLS] RESIDUES IN MARINE SPECIES, ECOLOGICAL SIGNIFICANCE, AND RELATION WITH NATIONAL LITTORAL CONTAMINATION

Baluja, G., J. M. Franco, and M. A. Murado (Inst. Quim. Org. Gen., Juan de la Cierva, Madrid, Spain)
Chemical Abstracts 80, No. 21, 116898e (May 27, 1974)

9.19 DIRECTORY OF INSTITUTIONS ENGAGED IN POLLUTION INVESTIGATIONS. (9.2)(9.6) CONTAMINANTS IN AQUATIC ORGANISMS

Anonymous
FAO Fisheries Circular No. 325, Food and Agriculture Organization of the United Nations, Rome, Italy (Mar. 1974), 52 pp. (Distribution restricted)

This directory contains the addresses of 233 institutions from 48 countries and indicates their special field of work and interest in research activities or routine activities associated with aquatic pollution monitoring. Countries are listed by geographical area, groups of organisms being investigated, categories of contaminants, aquatic medium (freshwater or marine), and other relevant activities. FTP

9.19

detergents have more than one mode of action, the most likely ones are denaturation of proteins and the alteration of membrane permeability and transport characteristics. Reduction in surface tension by detergents does not seem to be a cause of toxicity. As released to the environment detergents are already partially degraded. The author suggests that the maximum permissible level of 0.5 mg/l would probably be harmless under most conditions.
[1 figure, 1 table, 71 references] FTP

9.19 CHROMATOGRAPHIC AND BIOLOGICAL ASPECTS OF DDT AND ITS METABOLITES

Fishbein, Lawrence (National Center for Toxicological Research, Jefferson, AK 72079, U.S.A.)
Journal of Chromatography 98, No. 1, 177-251 (Mar. 27, 1974)

This review covers the column, thin-layer, gas-liquid, and liquid chromatographic, the combined liquid and gas-liquid chromatographic-mass spectroscopic techniques, and the biological and toxicological aspects of DDT and its metabolites. Primary emphasis of the review was on their utility, ecological distribution, and toxicity, and on the diverse techniques for their separation from polychlorinated biphenyls and other chlorinated pesticides and subsequent analysis. [42 figures, 30 tables, 254 references] FTP

9.2 MARKET SEGMENTATION BY AID ANALYSIS OF HOUSEHOLD CONSUMERS OF FISH IN CUYAHOGA AND SUMMIT COUNTIES, OHIO

Machamer, Albert V., and Lenoard J. Konopa
Institute for 21st Century Business Series No. 7, Center for Business and Ecomonic Research, College of Business Administration, Kent State University, Kent, OH 44242 (Apr. 1974), x + 103 pp.

This report is the fifth in a series dealing with a study of the marketing and physical distribution of fish and fishery products into the midwest United States. The first four monographs dealt with the results of surveys of wholesalers, retailers, institutional users, and consumers. The last report contains a description of the attitudes of regular and irregular consumers of fish as a menu item in the home. The present study involved market segmentation of household consumers by demographic and attitudinal variables utilizing the Automatic Interaction Detector program. These demographic characteristics and attitudinal variables were considered relative to purchasing behavior towards fresh finfish, frozen unprepared finfish, frozen prepared finfish, fresh shellfish, frozen unprepared shellfish, frozen prepared shellfish, and canned fish. Some observations were as follows:

1. The majority of regular purchasers of fresh finfish are at least 35 years of age.

2. The physical food-satisfying characteristics, especially taste, of fresh finfish have a strong influence on the consumer purchase rate of fresh finfish; economic, prestige, convenience, and diet attributes have little influence. The



9.2 FIVE HELPFUL HINTS ON SOCIAL FORECASTING

Yankelovich, Daniel (Daniel Yankelovich, Inc., New York, N.Y.)
Food Product Development 8, No. 2, 22, 24, 26, 31-32 (Mar. 1974)

Many changes are taking place in the social environment; the marketing executive should develop skills in social forecasting so as to steer his company and its products successfully through such changes. In this article, the author gives examples of social changes that have taken place and describes actual responses, successful and unsuccessful, that were made by specific companies. Then he gives five helpful hints for users of social forecasting methods. These are as follows.

Hint 1. Distinguish the fads of the moment and fashion from the long-term unidirectional deep trends. Fads often accompany trends and thus are often difficult to separate from each other. The marketing executive should distinguish between rapidly changing forms of expression of new trends such as those that may last only months or years in contrast to basic trends that grow steadily into the foreseeable future.

Hint 2. The age of a person has become an important factor in the exercise of discrimination. In the past, the biological generation (20 years) and the social values generation had about the same span. However, today the biological generation is still about 20 years but the social values generation has been reduced to about 7 years.

Hint 3. The college youth are not always a precursor group; a great many trends do not originate on the campus.



9.2 (9.6) YEARBOOK OF FISHERY STATISTICS FISHERY COMMODITIES 1972

Anonymous
Dept. of Fisheries, Food and Agriculture Organization of the United Nations, 00100 Rome, Italy (1973), vol. 35, xix + 328 pp. Copies may be obtained from sales agents for FAO publications or: Distribution and Sales Section, FAO, 00100 Rome, Italy. $7.00; £2.80; FF35.00.

In this issue the annual statistics on production and international trade in fishery commodities previously published in volume 33 (for 1971) are revised by the addition of data for 1972. The yearbook is divided into eight sections. The first section contains summaries on disposition of catch and international trade in fishery commodities. The next seven sections are subdivided into: production by countries and products, exports and imports by countries, and exports from the principal exporting countries. The seven sections include: fresh, chilled, and frozen fish; dried, salted, and smoked fish; fresh, frozen, dried, salted, and otherwise treated crustaceans and mollusks; fish products whether or not in airtight containers; products and preparations made from crustaceans and mollusks whether or not in airtight containers; oils and fats of aquatic animal origin; and meals and solubles for feedingstuffs made from aquatic animals. The data are presented in table form. SW



9.2 WORLD FOOD: PRICES AND THE POOR

Schertz, Lyle P.
Foreign Affairs 52, No. 3, 511-537 (Apr. 1974) [Published quarterly by the Council on Foreign Relations, Inc., Editorial and Business Offices, 58 East 68th St., New York, NY 10021]

The world food situation has changed drastically in the last 2 years and now appears to be seriously unstable for some more years. Adjustment to the new price situation is a major challenge for the United States and other developed countries. We must now reexamine every aspect of our habits and policies. Americans must recognize that they may have given themselves too much credit in the past for a generosity that in fact accorded with the market sicuation of American farm interests. However, the entire world must now examine new approaches; solutions to the food problem call for concerted action by many countries and by international organizations. The impact on the developing countries should be at the top of our common concerns.
[5 footnotes] FTP

9.2

Hint 4. Behavior will often change before attitudes change.

Hint 5. Be on the lookout for the false leap fallacy. A changing trend in the environment, for example, may not reflect a similar trend in the people themselves.

The author mentioned that his firm has identified over 30 social trends and that these trends are described in a brochure. A copy of the brochure may be obtained by writing to Food Product Development, Reader Service Dept., 2 N. Riverside Plaza, Chicago, IL 60606 and specifying March 1974 Reader Service Card item number 805. FTP

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9.3 LATIN AMERICAN CLAIMS ON LIVING RESOURCES OF THE SEA

Bath, C. Richard (Dept. of Political Science, University of Texas, El Paso, Tex.)
Inter-American Economic Affairs 27, No. 4, 59-85 (Spring 1974)

The author presents in a systematic way the Latin American Claims on living resources of the sea using Latin American information sources. He hopes that his presentation will offer a better comprehension of the Latin American position.
[99 footnotes] FTP

9.2

consumers' concern about the freshness of the finfish appears to have reduced potential sales.

3. Taste is the most important product attribute involved in the appeal for frozen unprepared finfish products.

4. Younger people tend to consume higher levels of frozen prepared finfish than do older people. A large percentage of the consumers considered frozen prepared finfish as poor tasting products.

5. In regard to fresh shellfish, taste primarily but also preparation required, aroma, cooking, and image (as a menu offering for guests) lead to higher average purchases for these products.

6. The most important variable in frozen unprepared shellfish was taste; nevertheless, many consumers purchased these products to provide menu status for dinner guests.

7. In regard to purchases of frozen prepared shellfish, taste was the most important variable of concern, but wholesomeness and quality were also important.

8. The appetizing appearance and the quality of canned fish were important factors influencing the high rates of purchases of these products.

[13 figures, 22 tables, appendix] FTP

9.2 HOW DIFFERENT COMBINATIONS OF POSTAGE ON OUT-GOING AND RETURN ENVELOPES AFFECT QUESTIONNAIRE RETURNS

Hewett, W. C. (University of Alabama)
Journal of the Market Research Society 16, No. 1, 49-50 (Jan. 1974) [Published by the Market Research Society, 51 Charles St., London W1X 7PA, England.]

Market research analysis contemplating a mail survey study may find the results of this mail questionnaire project of interest. This study considered the response rates when two combinations of postage were used on outgoing and return envelopes as follows: Group 1. hand-stamped outgoing envelope--hand-stamped return envelope; Group 2. hand-stamped outgoing envelope--first-class postal permit business reply return envelope. The purpose of the study was to find out if there would be a significant difference in the response rate of the two different groups to a mail questionnaire when hand-stamped return envelopes were compared with first-class postal permit (F-CPP) business reply return envelopes; hand-stamped outgoing mail was used in both groups. Seventeen-hundred and sixty households received questionnaires for the study, about half this number for each group.

The respondents in Group 1 returned 50.7% of the questionnaires; respondents in Group 2 (the group that received the F-CPP business reply return envelopes) returned 42.4% of the questionnaires. The results were statistically significant. The results of this study confirmed a previous observation that hand-stamped return envelopes do result in a higher response rate than first-class postal permit reply return envelopes. FTP

9.2 GRAPHICAL TECHNIQUES IN STATISTICAL DATA ANALYSIS--TOOLS FOR EXTRACTING INFORMATION FROM DATA

Feder, Paul I. (General Electric Compnay, Schenectady, N.Y.)
Technometrics 16, No. 2, 287-299 (May 1974)

In analysis of statistical data, there is need for numerical and graphical techniques. The numerical techniques contain objective measurements that can be used to evaluate the evidence shown in the graphical displays. An advantage of graphical techniques is that they require only simple arithmetic. The purpose of this article is to illustrate the use of graphical techniques in the analysis of statistical data. The demonstration is based upon the data yielded by an experiment involving a comparison of treatments. The author suggests that many statistical analyses should be preceded and supplemented by graphical analysis. In this manner, insight and understanding of the implications of the data can be revealed; the use of formal numerical techniques alone would not be so helpful. When the insight on a feature of the data has been obtained by graphical analysis then the numerical procedures can be used for a check on the tendencies, shown graphically, for increased precision and objectivity. The graphical analyses suggest which numerical procedures to use and whether their assumptions are satisfied or unsatisfied. The results of this procedure in turn suggest new graphical displays to prepare. The author believes that graphical and numerical techniques complement each other and should be used iteratively. The discussion in the article shows step-by-step how the various graphical techniques, used together with the classical numerical techniques, extract the significant information contained in the data.

[6 figures, 2 tables, 30 references] SW

9.2 (9.6) THE OCEANS AND NATIONAL ECONOMIC DEVELOPMENT

Anonymous
Prepared by the National Oceanic and Atmospheric Administration for the Committee on Commerce, U.S. Senate (1973), xi + 263 pp. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. $2.05.

This publication contains the proceedings of a conference held in Seattle, Wash., July 17-19, 1973. The conference was held to discuss six aspects of the oceans and the coastal zone relative to the importance of economic well-being of the United States: (1) energy and mineral resources; (2) living resources; (3) recreational resources; (4) coastal zone management; (5) regional organizations; and (6) marine transportation. The conference brought together leaders in government, industry, and the academic and environmentalist communities to assess current ocean policies and programs and future goals. An author index list is provided. SW



9.3 (9.19)(9.17) SAVING THE SEASHORE: MANAGEMENT PLANNING FOR THE COASTAL ZONE

Romero, Richard, and James Schenkel (Hastings College of Law, University of California, San Francisco, CA 94102)
Hastings Law Journal 25, No. 1, 191-211 (Nov. 1973)

Up to very recently, the planning and management of the coastal zone was almost entirely left to local government. Such fragmentation of responsibility, often coupled with local bias, has posed serious problems relative to the proper maintenance of the natural aspects of the coastal zone. Thus, some form of Federal and/or State regulation of the coastal zone appears necessary if the zone is to serve as a national resource yet still be preserved for the enjoyment of future generations.

The Federal Coastal Zone Management Act of 1972 is designed to provide incentive to the states to enact legislation for coastal zone management; it establishes guidelines for the kinds of state programs which will qualify for federal assistance. In 1972 the State of California passed the California Coastal Zone Conservation Act of 1972. In the present paper the authors discuss the essential features of these two acts and consider the ways in which the acts do and do not establish realistic mechanisms for the achievement of the stated goals. They also suggest possible ways to revise and improve the two acts.

In their conclusions, the authors state that while it is encouraging to see that Federal and State governments are responding to public demands for coastline



9.3 SOME ASPECTS OF INTERNATIONAL FISHERY LAW

Wurfel, Seymour W. (principal investigator) (Law School, University of North Carolina)
Sea Grant Publication UNC-SG-74-01, University of North Carolina (Mar. 1974), 90 pp. Available from Sea Grant Program, 1235 Burlington Laboratories, North Carolina State University, Raleigh, NC 27607)

This publication contains nine essays on various aspects of international fisheries law. The papers were prepared by students in the Law School of the University of North Carolina, with an Introduction prepared by the principal investigator. The reports are as follows:

"Introduction" by Seymour W. Wurfel, p. i;

"Problems Concerning the Establishment of Exclusive Fishery Rights" by Richard M. Fawcett, pp. 1-12; [67 footnotes];

"The Fisheries Dilemma--Unilateral Action Supporting the Right to Ocean Resources" by Bill Freeman, pp. 13-22 [70 footnotes];

"United States Participation in the Treaty Regulation of Fishery Conservation" by Paul Messick, pp. 23-33 [67 footnotes];

"The Problems of Enforcement of United States Fishery Laws and Treaties" by Richard H. Weisberg, pp. 34-50 [150 footnotes];

"Japanese-American Efforts to Conserve Living Marine Resources" by Winston L. Page, Jr., pp. 51-57 [59 footnotes];

"The Private Fishery Agreements Between the People's Republic of China and Japan" by Charles T. Hall, pp. 58-65 [65 footnotes];



9.3 LEGALITIES CONCERNING FOOD ADDITIVES

Middlekauff, Roger D. (Carr, Bonner, O'Connell, Kaplan & Thompson, 900 - 17th St., NW., Washington, DC 20006)
Food Technology 28, No. 5, 42, 44, 46, 48 (May 1974)

Additives are used in foods as emulsifiers, stabilizers, thickeners, preservatives, surfactants, anticaking agents, colors, and flavors. In this article, the author reviews the regulations on food additives and GRAS (Generally regarded as safe, CFR, Title 21, Section 121.4000) substances, discusses how to determine if a substance may be used in food, and describes how to go about obtaining approval to use a substance in food by means of a food additive petition, a GRAS affirmation petition, and an independent determination.
[18 references] FTP

9.3

"The Cod War: Iceland, England and the International Court of Justice" by David P. Dickey, pp. 66-73 [26 footnotes];
"Norwegian Fisheries Policy: The EEC Membership Negotiations and After" by Amos C. Dawson, III, pp. 74-84 [9 footnotes]; and
"International Law and the Conservation of Whales" by Gene Stallings, pp. 85-90 [35 footnotes]. FTP

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9.3 STATE AND FEDERAL JURISDICTIONAL CONFLICTS IN THE REGULATION OF UNITED STATES COASTAL WATERS

Suher, Thomas, and Keith Hennessee (University of North Carolina)
Sea Grant Publication UNC-SG-74-05, University of North Carolina (Apr. 1974), 75 pp. [Available from Sea Grant Program, 1235 Burlington Laboratories, North Carolina State University, Raleigh, NC 27607]

The purpose of this legal study was to examine the problems involved in regulating the use and conservation of United States coastal waters and their resources. The focus was on the interaction and conflict between the federal government and the State governments relative to jurisdiction over the coastal waters. The format of the study involved four basic areas of inquiry: fishery resources, the continental shelf, port jurisdiction, and environmental regulation. In their analysis, the authors reviewed the present state, federal, and international laws in each area, the conflicts engendered by the overlapping regulatory schemes, and recommendations for possible resolutions of these conflicts. FTP
[116 footnotes]

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9.3 THE LEGAL LINE BETWEEN TRADE SECRETS AND TECHNICAL KNOWLEDGE
(9.5)

Moyerman, Barry (Air Products and Chemicals, Inc.)
Research Management 17, No. 2, 28-32 (Mar. 1974)

Trade secrets, the author states, are again coming into vogue because of the increasing hostility to the patent system being demonstrated by the Federal courts and the Department of Justice. In a recent court case, the problem of employer trade secrets and employee technical knowledge was summarized as follows:

> "An employer who discloses valuable information to his employee in confidence is entitled to protection against the use of these secrets in competition with him. But the employee who possesses the employer's most valuable confidences is apt to be highly skilled. The public is interested in the reasonable mobility of such skilled persons from job to job in our fluid society, which is characterized by and requires the mobility of technically expert persons from place to place, from job to job upward within the industrial structure. And the employee himself must be afforded a reasonable opportunity to change jobs without abandoning the ability to practice his skills."

In this article, the author discusses the legal guidelines for distinguishing between trade secrets (which belong to the employer) and experience gained in the course of employment (which belongs to the employee). FTP

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9.2 A REPORT ON THE NATIONAL MARINE FISHERIES SERVICE
(3.235) COMMINUTED FISH CAKE SURVEY

Morehead, Bruce C. (Market Research and Services Div., National Marine Fisheries Service, NOAA, Washington, DC 20235)
Marine Fisheries Review 36, No. 5, 34-37 (May 1974)

During the past 2 years, staff of the technological laboratories of the National Marine Fisheries Service have developed a comminuted fish cake from species of fish such as whiting, hake, and ocean perch. The present study consisted of a survey of food service operations (in-plant feeders, hospitals, universities, primary schools) to evaluate the market for comminuted fish cakes in this area. The survey involved 90 establishments in 10 cities; in 73 of the establishments the comminuted fish product prepared from whiting or hake was tested and evaluated. This paper reports some of the responses obtained in the survey that provide a insight to the important factors relating to the acceptability of the product.
[1 illustration, 2 tables, 2 appendixes] FTP

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9.3 (9.19)(9.17)

preservation, much work remains to insure that the goal will be achieved. To protect America's coastline, laws that are enacted must limit short-range development with effective interim controls, must encourage public participation and enforcement by allowing the maintenance of citizen suits, and must mandate state compliance (by Federal legislation) in establishing coastal zone management programs.
[172 footnotes] FTP

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9.3 INTERNATIONAL REGULATION OF MARINE FISHERIES, A STUDY OF REGIONAL FISHERIES ORGANIZATIONS

Koers, Albert W.
Published by Fishing News (Books), Ltd., London, England (1973), 368 pp. £5.50.
J. C. P. M. Op De Coul (reviewer) (Utrecht, The Netherlands)
Aquaculture 3, No. 2, 209-211 (Apr. 1974)

In this book the author (1) describes the structures, functions, and power of existing international fisheries organizations, (2) evaluates the structure of the fisheries bodies, (3) evaluates the functioning of the fisheries organizations from the standpoint of the essential problems of the law of marine fisheries, (4) develops numerous suggestions for improving the existing structures and powers of the international fisheries agencies, and (5) offers suggestions for the future law of marine fisheries. FTP

9.3 (9.2) THE ELEVENTH HOUR FOR ALASKA'S SALMON FISHERY: A PROPOSED REGULATORY SOLUTION

Gorelick, Jeffrey A.
Ecology Law Quarterly 3, No. 2, 391-423 (Spring 1973)

The author discusses first the historical development of the Alaska salmon fishery and the economic factors that are causing depletion of the salmon resources. He proposes a regulatory solution that will enable the salmon resources to recover their biological equilibrium and that will provide economic support for those fishermen most dependent upon the resource. These proposed regulations would impose limitations on the entry of fishermen into the industry. The specific purpose of the regulations would be (1) to reduce fishing levels to a point where the fishery will be safe from continued depletion, (2) to permit those fishermen most dependent on the resource to support themselves and their families, and (3) to stabilize a level of participation in the fishery that will reduce the fluctuations of catches. The gear limitation program considers eligibility for a gear license, transfer of gear license, allocation of fishing units to various fishing areas, and license fee. The author also discusses the potential legal challenges to this form of state regulation of fishing activities.

The author recognizes that any new regulatory program threatening long-established commercial practices regarding a common property resource is likely to provoke judicial disputes. However, he believes that the present condition of the Alaska salmon fishery requires forceful action to preserve the salmon as a commercially viable resource. The reduction in fishing gear advocated in his proposed regulation is perhaps the only method that can guarantee the existence of a commercial salmon fishery for future generations. [161 footnotes] FTP



9.5 (0.9) SCIENTIFIC RESEARCH COMPETENCE AS A FUNCTION OF CREATIVE ABILITY

Connor, Patrick E. (School of Business, Oregon State University, Corvallis, Oreg.)
IEEE Transactions on Engineering Management EM-21, No. 1, 2-8 (Feb. 1974)

Many observers believe that the most important characteristic of competence in scientific research is creative ability to relate usefully seemingly unrelated concepts in a new and novel fashion: to form new gestalts. However, the actual work produced by a scientist must be considered the most direct operational index of a scientist's research competence. The purpose of this study was to provide information on whether creative ability truly does provide a measure of a scientist's manifested research competence. Creative ability and scientific research competence were assessed for each member of a total sample of 64 scientists. These scientists were selected from a large unit of a state university and from an independent research laboratory. Creative ability was assessed by the Remote Associates Test [M. T. Mednick and S. A. Mednick, Remote Associates Test: Examiners Manual, Houghton Mifflin, Boston, Mass. (1967)].

Although the results of this study were not considered definitive, they offered some clues as to the character of scientific research competence. First, no individual variable operating alone (psychological, social, or organizational) is sufficient to explain variations in research competence among scientists. Second, important differences in environmental properties exist among research organizations; furthermore there are in fact such differences between the University and independent research laboratory settings. Third, manifest research competence appears to depend on psychological, social, and organizational variables



9.6 (9.125) AGEING OF FISH

[Various authors and topics]
Proceedings of an International Symposium published by Unwin Brothers Ltd., Old Woking, Surrey, England (July 1974), 240 pp. U.K. £5.00; US$16.00. Post free within the U.K.

This book contains the proceedings of an international symposium organized by the European Inland Fisheries Advisory Commission of FAO, the Fisheries Society of the British Isles, and the Freshwater Biological Association at the University of Reading, England, held in July 1973. The scientific papers in the proceedings are arranged into five sections. The first section deals with the scientific basis of age determination in fish (6 papers); the second, methods of determining age in fish by machine (2 papers); the third, overcoming and eliminating errors in age determinations (6 papers); the fourth, some sources of errors in age readings; and the last, the effects of errors in age determinations on freshwater and marine fishery management, fishery modeling, and growth and population studies. The 21 authors are from the United States, Canada, Puerto Rico, Mexico, Nigeria, The Netherlands, and the United Kingdom, and they are classified as 12 freshwater fisheries biologists, 7 marine biologists, and 3 academic physiologists. FTP



9.8 (1.0156) (1.9) THE INVASION OF SAURIDA UNDOSQUAMIS (RICHARDSON) INTO THE LEVANT BASIN--AN EXAMPLE OF BIOLOGICAL EFFECT OF INTEROCEANIC CANALS

Ben-Yami, M. (Fisheries Technology Unit, P.O. Box 699, Haifa, Israel), and T. Glaser
Fishery Bulletin 72, No. 2, 359-373 (Apr. 1974)

A faunistic, zoogeographical approach to the marine animal migration through the Suez Canal is common to most investigators of the canal's influence. Animal species native to one sea and found in the other after the opening of the canal serve as main indicators of its biological influence and of its effectivity as a link to the migrant species and as a barrier to others.

Some authors have discussed the Red Sea-Mediterranean animal migrations in relation to ecological conditions in the canal and in the adjacent sea areas, suggesting that the mechanism of the penetration of some species through the canal and their expansion in the Mediterranean is associated with environmental conditions (salinity, currents, nature of substrate, etc.).

In this paper we discuss the ecology of the migration and expansion in the new habitat of an important commercial fish. We examine its dynamic coexistence with its native competitor in view of the changing environmental conditions.

The Red Sea lizardfish, Saurida undosquamis (Richardson), invaded the Levant Basin and established a population of considerable commercial importance. Its expansion came at the expense of other commercial fishes on which it preys and

9.5 (0.9)

in combination. This point is extremely critical for the behavioral scientist who wishes to examine the research process and for the research director who wishes to optimize organizational conditions for research excellence.

The author concludes that the organizational environment affects the manifestation of creative ability into research competence. It appears clear not that creativity is unimportant to research competence, but rather that the successful employment of creative ability in research is strongly affected by psychological, social, and organizational variables. Thus, there is not a straightforward relationship between creativity and scientific productivity. Additional information is needed particularly in the identification of those psychological, social, and organizational conditions which combine to influence the production of quality research, and in the elaboration of ways in which such combinative influences operate.
[7 tables, 24 references] FTP

9.8

with which it competes. The explosion of the Red Sea lizardfish population in the Levant Basin was made possible by a combination of changes in the environmental conditions (abiotic and biotic), one of these being the retreat of, or the recession in, the native hake population. The dynamic coexistence between the lizardfish and the hake, its main competitor, is affected by fluctations in the abiotic conditions to which the hake seems to be more sensitive than the lizardfish.
[8 figures, 2 tables, 48 references] Extracted

9.3 THE FRESHWATER FISH MARKETING CORPORATION OF CANADA
(9.2)

Lamb, Charles W., and Donald F. Mulvihill (Kent State University, Kent, OH 44240)
Institute for 21st Century Business Series No. 6, Center for Business and Economic Research, College of Business Administration, Kent State University, Kent, OH 44240 (n.d.), viii + 124 pp.

Four monographs have already been published by staff of Kent State University relative to the physical distribution and marketing of fish and fishery products in the Midwest area. These reports dealt with the use of fish and attitudes of (1) wholesalers, (2) retailers, (3) institutional users, and (4) household consumers in Cuyahoga and Summit Counties in Ohio. The present monograph reports on a study of the Freshwater Fish Marketing Corporation of Canada, and it describes the freshwater marketing situation in Canada before and after establishment of the corporation.

During the course of study on the overall project the investigators found that some of the fish, particularly freshwater species, for Cuyahoga and Summit Counties originated in Canada, and that these fish were marketed through the Freshwater Fish Marketing Corporation (FFMC), a federally established institution. Because there were some producers cooperative organizations in the United States, but none with exclusive market rights, the authors felt that this study of the FFMC would prove useful to members of the fishing industry and students of marketing, and would provide a basis for further study of the cooperative as a part of the distribution structure. The report is divided into three major sections: I. Background and Establishment of the Corporation. II. A Comparison of the Marketing Systems Before and After the Creation of the Freshwater Fish Marketing Corporation. III. Implications and Research Recommendations.
[7 figures, 3 tables, 41 references, appendix with 5 tables] FTP

9.6 CONCISE COVERAGE OF FOOD DEVELOPMENTS ABSTRACTED
(0.6)

Anonymous
Food Product Development 8, No. 3, 26 (Apr. 1974)

The biweekly newsletter Adlibra reports the latest food developments, drawing upon 100 food and related industry periodicals. The information is classified under subject areas as new products; research, development, and processing; marketing; and food patents. The listing of patents is taken from the Official Gazette of the U.S. Patent Office (published weekly). Foreign periodicals are also covered. The subscription price is $60 per year for 26 issues. Write to K & M Publications, 195 Colony Way, Louisville, KY 40207. FTP

9.6 RUSSIAN-ENGLISH DICTIONARY FOR STUDENTS OF FISHERIES AND AQUATIC BIOLOGY

Ricker, W. E.
Bulletin 183, Fisheries Research Board of Canada, Environment Canada, Ottawa, Ontario (1973). $7.00 in Canada; $8.40 other countries.

This bulletin is available by mail from Information Canada, Ottawa, Ontario, Canada, and at the various Information Canada bookshops. FTP

2.113 COMPOSITIONAL FACTORS AFFECTING THE EFFICIENCY OF UNDERWATER ANTICORROSIVE PAINTS OF THE ANODIC PASSIVATION TYPE

Ghanem, Nadium A., and Mahmoud A. Abo-Khalil (Lab. Polym. Pigm., Natl. Res. Cent., Cairo, United Arab Republic)
Chemical Abstracts 80, No. 22, 122469g (June 3, 1974)

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2.113 APPLICATION OF THE POLARIZATION RESISTANCE METHOD TO THE STUDY OF THE CORROSION BEHAVIOR OF COPPER-NICKEL-IRON (CuNi10Fe) IN SEA WATER

Ijsseling, F. P. (Corrs. Lab. R., Netherlands)
Chemical Abstracts 80, No. 22, 124533x (June 3, 1974)



7.8 COLLABORATIVE STUDY OF THE EXTRACTION OF LIGHT FILTH FROM CANNED SHRIMP

Dent, Russell G. (Div. of Microbiology, Food and Drug Administration, Washington, DC 20204)
Journal of the Association of Official Analytical Chemists 57, No. 3, 691-692 (May 1974)

The method for extraction of light filth (rodent hairs and fly setae) utilizes a washing technique for shrimp larger than 1 inch, followed by HCl digestion with mineral oil as the flotation liquid.
[1 table] FTP

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7.42 DETERMINATION OF BISMUTH IN MARINE SAMPLES BY ANODIC STRIPPING VOLTAMMETRY

Florence, T. M. (Res. Establ., Aust. At. Energy Comm., Lucas Heights, Australia)
Chemical Abstracts 80, No. 20, 112392n (May 20, 1974)



2.1479 (6.30) SEA HARVESTING APPARATUS AND METHOD

Randall, Alan C.; assignor to Sea Harvest, Inc., New York, N.Y. (pat.)
U.S. Patent 3,808,779
Official Gazette of the U.S. Patent Office 922, No. 1, 58 (May 7, 1974)

A diver from a boat works along the sea bottom to cut Irish moss or other seaweed growing at depths to 100 feet. A manually maneuvered sickle bar, powered by a lightweight air motor, is used to harvest the seaweed. FTP

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2.1125 MULTIPLE PURSE NET

Bannov, F. S. (pat.)
U.S.S.R. Patent 387,682
Soviet Inventions Illustrated (Section III Mechanical and General) 5, No. 16, 6 (May 25, 1974) [Patents available from the Patents Supply Division, Soviet Inventions Illustrated, Derwent Publications, Rochdale House, 128 Theobalds Rd., London WC1X8RP, England]

This multiple purse net has triangular ends on the multi sections interconnected by matching sections of larger mesh. FTP



9.9 (9.2) THE 1973 YEARBOOK OF AGRICULTURE

[various authors and titles]
House Document No. 93-29, 93d Congress, 1st Session, Prepared by Staff of the U.S. Dept. of Agriculture, Washington, D.C. (1973), xii + 388 pp. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 0100-02960. Price $5.70.

This 1973 edition of the yearbook of agriculture is a guide to helping families use their incomes to best advantage. It includes a foreword by Secretary of Agriculture Earl L. Butz and a preface by the yearbook editor Jack Hayes. The first section "Families" contains 17 articles dealing with family living costs, family records, family money management plans, safety in the home, and safe handling of foods. The second section "Dwellings" (36 articles) deals with the various aspects of planning, designing, financing, insuring, and remodeling a home. The third section "Furnishings" (15 articles) provides information on furnishing a home. The last section "Communities" (10 articles) deals with the achievement of a higher quality of life through community activities. The book is amply illustrated and contains an index. FTP

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